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ABSTRACT

In the last several years, one of the approaches that has been advocated as a mechanism to bring about needed improvements and revitalize education is the use of incentives. This paper suggests a conceptual framework for studying the uses of incentives in American public education and examines briefly the state-of-the-art of recent research and practice incentives. The primary focus of the paper is on incentives as they relate to the organization and governance of education in the public school systems. Several incentive programs are examined on the basis of three important characteristics: the reward offered, the individuals or organizations that may receive the reward, and program goals and/or results required to obtain the reward. Following consideration of these programs, a basic concept underlying all incentive programs is formulated. A conceptual framework is then proposed that has three main variables: (1) program targets, (2) goals/results, and (3) reward. Conclusions and recommendations are based not only on the material presented in this paper, but also on the literature reviewed. A 40-item bibliography is included. (Author/JF)

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A CONCEPTUAL FRAMEWORK
FOR THE STUDY OF INCENTIVES
IN AMERICAN PUBLIC EDUCATION

by

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A CONCEPTUAL FRAMEWORK FOR THE STUDY OF INCENTIVES IN AMERICAN PUBLIC EDUCATION

I. INTRODUCTION

A. Purposes and Limitations

In the last several years one of the approaches that has been advocated as a mechanism to bring about needed improvements and revitalize education is the use of incentives. Incentives, it has been argued, may be an essential ingredient in upgrading teaching techniques or in improving student performance. A wide variety of experimental and operational incentive programs has been tried and still others proposed.

The purpose of this paper are to suggest a conceptual framework for studying the uses of incentives in American public education and to examine briefly the state-of-the-art of recent research and practice on incentives. Review of the literature has been confined largely, although not exclusively, to the last 5 years. It is not, however, the purpose of this paper to present, per se, a review of the literature, but rather to use available information in developing concepts and providing illustrations.

The primary focus of this paper is on incentives as they relate to the organization and governance of education in the public school systems of the United States. Consequently, the extensive literature dealing with incentives as used in classroom learning studies and experiments is only treated peripherally.

B. Approach

In this paper the term "incentive program" is used to refer to a plan or program which by self-definition uses incentives as specific components of the program or, in some cases, meets one or more of the meanings of incentives included in the definitions found in Appendix A.

Several incentive programs are examined on the basis of three important characteristics: the reward offered, the individuals or organizations that may receive the reward, and program goals and/or results required to obtain the reward. Following consideration of these programs, a basic concept underlying all incentive programs is formulated. A conceptual framework is then proposed. The framework has three main variables: (1) program targets, (2) goals/results, and (3) reward.

Conclusions and recommendations are based not only on the material presented in this paper, but also on the literature reviewed as a part of the study which is then presented.

Appendix A to the paper contains definitions of incentive as used in several of the social science disciplines. Appendix E presents descriptions of several incentive programs in American education; the descriptions were derived from the literature.

II. CONSIDERATIONS IN THE DEVELOPMENT OF A CONCEPTUAL FRAMEWORK

A wide variety of proposed, experimental, and operational programs in public education have been labeled as incentive programs. These applications have ranged from performance contracting (called incentive contracts by some, e.g., Stucker and Hall (38)) to merit pay for teachers and including the use of incentives in the classroom for students to enhance learning, the latter sometimes in conjunction with bonuses for teachers and parents. Appendix B of this report describes seven examples of programs which use incentives as a basic component. These examples are neither representative nor exhaustive. They were chosen to illustrate not only the wide variety of incentive programs but also some of the ideas advanced in this paper.

Considering the wide variety of incentive programs, it seems reasonable to ask whether there are any common characteristics or components of the programs which may be abstracted to serve as the basis of a conceptual framework. This section addresses this question.

It is the position taken in this paper that incentive programs have three aspects which may be abstracted to serve as a basis for developing a conceptual framework. These three aspects are:

- (1) A reward is offered.
- (2) There are goals or results to be obtained.
- (3) Individuals or organizations may obtain the reward by achieving the goals or results.

In this section several incentive programs will be examined from the three points of view indicated by these aspects.

A. Targets of Incentive Programs

The targets of incentive programs are the entities which may receive the reward. Thus, in a program in which teachers are to be paid a bonus dependent on student learning, the teachers are the target, even though the students benefit as a result of better learning. Incentive programs may have provision for either individuals or organizations as targets. The incentive programs which have received the most attention are those which have been directed toward individuals; that is, personnel in the school system.

Coleman, for example, has noted that incentives in education are "...merely a special case of the general point that any organization is a system of interdependent incentives, and the functioning of the organization depends upon the adjustment of these incentives." (7, p. 1) He goes on to say that incentives may be adjusted for:

- (1) The School Superintendent
- (2) Staff members in the Administrative Office
- (3) Principals
- (4) Teachers
- (5) Children
- (6) Parents.

Jung, Lipe, and Wolfe identify the same general target groups (21, p. 20) and go on to point out that incentives may be provided to these target populations either individually or as groups (e.g., all or none of the teachers in a particular department, school, or district). Obviously, incentive programs may be directed at various combinations of these target groups.

Programs which have had various categories and combinations of individuals as targets have included: many experimental programs which used incentives to improve academic performance; two major programs - one testing of OEO and one by USOE - of large scale incentives in education; programs that have attempted to introduce merit pay for teachers using academic performance by students as the basis of the reward; as well as a number of operational merit pay plans, most of which do not use student achievement tests as measures. Most of the experimental programs have had students as the targets. Lipe and Jung (23) provide a review of the literature in this area which is substantially the same as that provided by Jung, Lipe, and Wolfe. (21) The latter also review in some detail eight student incentive programs. (21, Appendix A)

Some experimental programs either focused on the teacher or included the teacher and sometimes the parent as a part of a more inclusive design. Fox and Jung (12), for example, report a study which combined student, teacher, and some parent incentive in a brief experiment. They suggest that the results, although quite tentative, generally support the notion that incentives tend to enhance school learning. The nature of design, including the three types of incentive, does not yield information on which category of incentive may be most effective.

OEO, as a part of the large-scale study relative to performance contracting, included an effort (29) to test the effects of "incentive only." This program involved contracting with local school districts, which in turn contracted with the local teacher association to provide incentives to students and teachers. The OEO report includes results that indicate the use of incentives did not seem to contribute to academic (math and reading) improvement on the part of the students.

During the school year 1971-72 the U. S. Office of Education designed and implemented a 1-year project on the use of incentives in education. The experiment involved four school districts. In each district there were experimental and control schools. Two of the districts had "incentives to teachers only" programs, and two of the districts had "incentives to teachers and parents programs.

Planar Corp. (31) in its impact evaluation report generally concluded that the teacher only model did not demonstrate any differentially positive effects over the control school in improving student performance. On the other hand, the teacher/parent model did seem to have such effects. The report notes, however, that two features of the design impose severe limitations on the inferences which may be drawn from the study. (31, IV - 768) These design features are the lack of randomization in assignment of treatments to units and the small number of experimental units (i.e., only two per condition).

The OEO performance contracting study, of which the incentives only experiment mentioned above was a part, has also been criticized for lack of randomization in key features of the design. (28)

Merit pay programs have raised considerable controversy, usually because they have emphasized student academic achievement as the basis of the reward.

Thomas and McKinney, who treat incentive or merit pay plans as one of several possible programs that are part of the accountability movement, point out that:

The incentive pay plans advocated today seek to replace or supplement a salary schedule based on education and longevity with a plan that provides rewards to teachers commensurate with performance. (43, p. 40)

The usual incentive is a salary differential generally awarded for superior performance in the standard teacher role. In this context superior performance is intended to be determined by measures of student achievement or perhaps classroom observation.

The most important variation in merit or incentive pay plans according to Thomas and McKinney is differentiated staffing.

Differentiated staffing generally provides not only for differential roles for teachers but also for differential pay according to the role. (48) Within any one role, however, there is usually not a salary differential based on student achievement, which is, as noted above, supposed to be a prime factor of merit pay plans.

An article in Nations Schools (49) discusses briefly four merit pay plans including the so-called Clark plan for Washington, D. C., which proposed a four-level hierarchical staff of teachers with promotion from one level to the next higher level dependent in large part on student advancement in math and reading as measured by standardized achievement tests. This plan was opposed, it would appear successfully, by the teachers' union.

Rhodes and Kaplan (32) include descriptions of 11 merit pay plans, none of which seems to have as a feature the measurement of student achievement as a prime or even partial indicator for determining reward.

One salary plan for teachers described by Chaplin (5) as a merit plan seems to be essentially a salary schedule of the more traditional preparation-longevity type. Although targets for incentive programs may include a number of personnel in the educational system, when the experimental classroom studies are excluded, almost without exception the target has been teachers.

Two exceptions to this may be noted. Lake County, Florida has a plan which as described in "Outlook for Teacher Incentives" (49) uses a salary schedule based on training, experience, and school size plus a bonus of \$980.00 for principals. The bonus is conditional upon undertaking and completing an approved project. The other exception is the differentiated staffing plan being implemented in Temple City, California which redefines the traditional principal's role, eliminating the usual administrative details and emphasizing skills in group dynamics and social leadership. (37)

For incentive programs which have had personnel as targets, by far the greatest number has been directed at students. These are not, however, germane to this paper. Of the balance, the bulk of the programs have had teachers as the targets. In some experimental programs teachers, in combination with students and/or parents, have been the targets. In some of these experimental programs the reward has been given to all (e.g., all students in the classroom) only when the group achieved some minimum or average level of performance; otherwise, no one received the reward. In all cases, however, the net effect has been that an individual benefited.

All of the foregoing programs have, therefore, had one or more sets of individuals as the target. Another whole class of programs includes those directed at an organizational entity - schools or school districts, for example. One type of program aimed at school districts is intended to alter the form of organization itself. During the last half century one of the prime movements in American public education has been the movement toward more and larger comprehensively-organized school districts, which offer K-12 or 1-12 grades under a central administration. In California such comprehensively organized districts are called unified districts. The State of

California, as provided for in the California Education Code of 1959 as amended through 1972 (45), intends to have unified districts as the primary form of school district organization. To encourage the formation of such districts, additional monies over and above the basic state aid are offered to unified districts that meet certain conditions. This aid is (based on the 1969 level of support) about 2.6 percent and 2.1 percent of the basic aid for elementary and secondary school pupils, respectively.

Two of the reasons that have often been advanced for consolidating school districts are: (1) better educational, more diversified programs and (2) savings, for example, through elimination of duplicate facilities. One approach has been suggested to address directly the question of savings as a result of proper organization.

Cohn and Millman (6, p. 88) state that "considerable evidence demonstrating the existence of substantial scale economies in public (especially secondary) schools has been presented in recent years" They suggest that proper size of school districts may result in economies of scale, and they propose an approach. Unlike the California program, which is concerned with the form of school organization, Cohn and Millman are concerned with the question of size of the organization.

Another group of incentive programs which are aimed at the organizational level is not intended to change the organization per se, but rather hope to alter the structure or operation of education.

Johns (20) proposed to modify the Florida State Aid Program, a foundation program, by providing a portion of state monies by comparing the ratio of: (1) local (district) actual effort to support education in relation to the local effort required for a minimum program with (2) state average ratio of actual effort to minimum effort. This proposal to affect distribution of state aid monies differs from the Cohn and Millman proposal.

The latter were directly concerned with affecting organization, whereas here the concern is with structure; that is, the mechanism or operation of local (district) support of education.

Johns makes clear that an incentive program such as he proposes must be developed in the context of a particular state and its aid program and mentions that New York, Rhode Island, and Wisconsin have incentive programs.

Some incentive programs have had as an objective the changing of the structure or operation within the educational system. One example of this type of program is Title I of the Elementary and Secondary Education Act, which provides Federal assistance to local education agencies to improve educational programs for children of low-income families "...to meet the special educational needs of educationally deprived children." (9) The incentive portion of this program is in Part B, which provides for an incentive grant for qualified states that apply. Qualified states are those whose index of effort (the ratio of all non-Federal monies spent on education to total personal income) exceeds the national index (average of all states).

In summary, incentive programs may have as targets either individuals or organization entities. Incentive programs which have individuals as targets may be further described by the classes of personnel who are the targets within the school system. Incentive programs aimed at the organizational level, in contrast, may be further subdivided by the nature of the change that is sought: changes, on the one hand, to the organizational arrangement or changes, on the other hand, to the structure or operation.

B. Goals/Results of Incentive Programs

Three characteristics of incentive programs were identified and need to be examined in developing a conceptual framework. These characteristics are the:

- (1) Entities that may obtain the reward (as discussed above, the targets)
- (2) Results to be obtained
- (3) Notion of a reward.

The purpose of this section is to discuss the second of these characteristics.

One analytic technique for examining education is to view education as a system which has certain inputs, uses certain processes, and produces certain outputs. Thomas and McKinney (43), for example, in discussing the testing and evaluation issue in the "accountability movement," use this approach to distinguish the three parts of the system that may be evaluated; these are: (1) inputs (e.g., funding), (2) processes (e.g., teacher performance), and (3) outputs (e.g., student learning). This system's analytic approach will be used to examine the goals/results aspect of incentive programs.

The notion that the reward will be obtained when the results are achieved implies three additional ideas. First, that goals and results are consistent; that is, if the program goal is to alter an input, then the results (the conditions to be achieved to obtain the reward) will also be at the input level. Second, a procedure exists (method, process, technique) by which the results may be obtained. Third, there is a method for ascertaining whether the results have been achieved; that is, there is a method of measurement. Thus, the goals/results aspect of incentive programs may be examined

from three points: (1) goals/results consistency, (2) procedures to be employed, and (3) the measurement method.

1. Output Domain

Those incentive programs which use standardized achievement tests to measure, for example, student gains in reading and/or math are obviously dealing with results in the output domain. The USOE incentive project evaluated by Planar Corp. (31) and Blaschke (1) was of this type. This program had as a goal the demonstration of the feasibility of offering incentives to improve school learning, which is clearly in the output domain. The specific results were also in the output domain. Bonuses were to be paid to teachers only or to teachers and parents (the two incentive models) depending on the extent to which students showed improvement in fractional grade equivalencies (GE) over a basic gain indicator (BGI) for reading and math separately. The following table shows the required results and the associated payment:

<u>Improvement</u>	<u>Teachers</u>	<u>Parents</u>
Less than BGI	None	None
BGI	\$150	\$12.50
BGI + .1 GE	300	25.00
BGI + .2 GE	450	37.50
BGI + .3 GE	600	50.00

The instrument used to measure student gain was the Metropolitan Achievement Test Batteries, with average (mean) class improvement used to determine the amount of payment.

In this program the methods to be used by the teachers to improve student learning were not specified. Teachers in the experimental schools were free to select those methods or combinations of methods which they thought would best produce the desired result. It must nevertheless be

taken as a given that it was a basic assumption of this program that such methods do in fact exist, and that such method (s) were probably different than those used in the control schools.

The OEO study of performance contracting was similar, in the respects discussed above, to the USOE program. The OEO study: (1) had as a goal the improvement of student learning (output), (2) specified output results for which rewards would be paid, (3) used standardized achievement tests as the measurement method, and (4) left the choice of method up to the contractors or, in the case of the incentives only portion of the study, to the teachers. This exclusion of methodology as an explicit consideration in the OEO study has been criticized by Miller (28) as a serious omission. It has been argued on the other hand, however, that if contractors (or teachers) are to be accountable (or paid) on the basis of output, then it is improper to control the methods that may be used to obtain the results. (40)

2. Input Domain

In contrast to the foregoing examples which dealt with educational system outputs are those incentive programs which have as a general goal the alteration of an input characteristic. Those programs cited earlier as having organizational entities as the target have the change of an input characteristic as the goal. The State of California program (45) to achieve unified school districts as the basic form of school organization is of this type (assuming, of course, that one is willing to define the form of school organization as being in the input domain). In this case the result and the goal are identical; that is, the reward is obtained only by unified school districts meeting certain conditions. The measurement method is essentially an administrative process determined in part by the provisions of the California

Education Code and in part by rules and regulations of the State Board of Education, and carried out by the Superintendent of Public Instruction. In this case the method by which unified districts are to be achieved is a political procedure and is spelled out in the code. (45, Division 5, Chapters 1-10)

Cohn and Millman who propose an approach to obtain economies of scale also expect to affect school organization. They state: "An explicit incentive structure in the state aid process would not only provide a certain degree of stimulus to change but would also serve to focus attention on the scale issue." (6, p. 89) The Cohn and Millman approach differs from the California program in four important ways. First, it is a proposed rather than an operational program. Second, it is limited to the secondary school level. Third, it is the size of the organization rather than its form that is of concern. Fourth, it requires the assumption that a proper or optimum-sized school (or district) may be determined. In discussing this last issue they (6) note that "...most of the studies indicate a U-shaped relationship between per pupil cost and school size, measured by enrollment. It follows that most schools are either too large or too small...." (p. 89) Their report goes on to note, however, that there is some indication that U-shaped relationships may not be accurate and that it is possible that costs might decrease indefinitely as school size increases. (p. 91) Nevertheless, they assume the U-shaped relationship in proposing a program of promoting economies of scale.

Cohn and Millman propose, for example, that as districts deviate from the optimum size they be penalized an appropriate amount of their state aid monies, and the greater the deviation, the greater the penalty. In this example the purpose of the proposal may be taken as "to obtain optimum-sized school districts" and the results as "the closer to

optimum, the smaller the penalty." Thus, both the goal and the results are in the input domain.

The measurement method required for this program, while technically complex to establish, is relatively simple to operate once in place. It involves the determination of an optimal sized school (district), the unit cost of such a district, the unit costs for each district in the state, a legislatively-established scale factor, and the use of enrollment data (ADA) to compute the appropriate penalty factors and the loss of state aid monies. Cohn and Millman do not specify procedures by which schools or districts could reduce their deviation from optimum size, although in most cases it is likely that political procedures would be required.

Johns' proposal (20) like Cohn and Millman also deals with the distribution of state aid monies. Unlike Cohn and Millman, however, Johns is not concerned with the organizational question but rather with structure, in this case with the mechanisms by which the amount of local support for education is determined. Johns states the goal of his proposal as follows:

The purpose of this incentive grant is to give additional state financial help to those districts that are willing to help themselves financially. (20, p. 9)

Districts would receive additional state aid money if the ratio of their local effort to local requirement exceeded a state average ratio of effort to requirement, whereas districts whose ratio fell below the average would lose a portion of the state aid money. Thus, both the goal and the results (the conditions for which the reward would be paid) are in terms of funding and clearly in the input domain. The measurement method is essentially administrative and involves the computation of the appropriate

indices and ratios from data which would be supplied by the districts in routine reports. Johns addresses the changes required in the Florida laws governing the state foundation aid program but does not deal with the question of how districts may go about altering the amount of local support. It may be assumed, however, that the procedures are those that determine how local school taxes are levied and are political in nature.

Incentive programs with individuals as targets may have goals/results in the input domain. Programs which deal with teacher preparation, including continuing professional growth, may be of this type. Chaplin (5) reports a program in the Hartford, Wisc. Union High School District, which has as its goal the continuing professional growth of teachers and where professional growth is essentially synonymous with additional academic preparation. The plan involves a preparation/longevity salary schedule which has seven levels of academic preparation, from BA to MA + 18 units, and for each level an allowance for longevity from 1 annual increment at the BA level to 10 annual increments at the MA + 18 level. This program has both its goal and its results in the input domain. The measurement method of this program is practically self-administering and clearly involves no more than evidence of successful completion of academic course work, as well as records for longevity. The procedure is also quite clear - one merely enrolls in and passes academic course work.

3. Process Domain

Although they are generally less common, incentive programs whose goals/results are in the process domain of the educational system may also be found. Lipe, Weisgerber, and Fox (24) report a project to develop and validate a package to communicate the use of incentives to

elementary and middle school teachers and administrators. Stucker and Hall (39) describe a performance contract in which the Institute for Development of Education Activities undertook to teach individualized instructional techniques to teachers. The former, however, was not developed as an incentive program, and in the latter the incentives were to be paid to the contractor rather than the teachers. Both programs, however, clearly deal with the process domain of the educational system. An example of a program which has goals/results in both the input and process domains is taken from Rhodes and Kaplan. (32) The goal of the program is, as Rhodes and Kaplan quote from the district handbook, to "recognize the quality of teacher performance as well as the quality of teacher training and experience." That portion of the goal dealing with training and experience is the input domain, and the portion dealing with performance is the process domain. This program uses three similarly-structured preparation/longevity salary schedules. Each schedule provides for the same levels of preparation and increments of experience. The differences, however, are the amount of pay for corresponding steps and the amount of the annual salary increment. Teachers may, with the specified years of experience, be considered for promotion to the higher schedules. Promotion as well as retention on the higher schedules is determined by three factors: (1) a valid certificate, (2) professional growth (6 hours of graduate work), and (3) an appropriate evaluation rating. The certificate and professional growth requirements are in the input domain. The measurement for evaluation is basically an observational method.

Evaluation is done by the administrative and supervisory staff for all teachers as they become eligible and every 2 years thereafter. Written evaluation forms are used and reviewed with the teachers, who have the right of appeal.

Teachers are evaluated on five factors: (1) personal fitness for teaching, (2) classroom effectiveness, (3) relationship with students, (4) relationship with parents, and (5) relationship with staff. Each factor is rated on a five-point scale: (1) outstanding, (2) excellent, (3) above satisfactory, (4) satisfactory, and (5) needs improvement. Evaluation is done in accordance with a written guide, with most weight given to classroom effectiveness.

It is expected that teachers on the Basic Schedule will generally receive ratings of satisfactory. Teachers on the Career Schedule must have ratings of above satisfactory to excellent. Finally, teachers on the Master Schedule must have ratings of excellent to outstanding.

An example of a program with a goal in the process domain but targeted at an organizational entity is the Title I program of the Elementary and Secondary Act, Part B of which provides for special incentive grants. The goal of the program and the use of the incentive funds are quite clear.

Sec. 101 of the act states (in part):

...The Congress hereby declares it to be the policy of the United States to provide financial assistance (to local educational agencies) * to expand and improve their educational program ... to meeting the special educational needs of educationally deprived children. (9)

This is clearly a case where the objective is to affect the process domain. The special incentive grants are not, however, awarded

* words in brackets paraphrase provisions of the act

on the basis of improvement in education of the disadvantaged. The procedure that is followed instead includes the determination of individual state indices and a national index of effort. The indices of effort are ratios (expressed in per centa) of expenditures of all non-Federal money spent on public elementary and secondary education to total personal income. Those states whose indices exceed the national index are entitled to a special incentive grant.

Although the special incentive grants are given to support compensatory education, the basis of reward is total educational expenditures. This has been criticized, for example, by Wilensky (46) as an inappropriate use of incentives to promote compensatory education and also on the basis that individual districts can do little to contribute to the state index.

More importantly for the purpose of this paper is the fact that, while the goal is in the process domain, the results (functioning) and measurement (computation of indices) are in the input domain.

C. Reward

This section discusses the third of the three key aspects of incentive programs - namely, the reward. Three aspects of reward warrant discussion: (1) the nature of the reward, (2) the timing of the reward, and (3) the mechanism of delivery.

1. Nature of Reward

All of the examples of incentive programs given in this paper used monetary rewards, and in the case of school personnel, primarily salary or bonuses. While it may be the case that for programs in which an organizational entity is the target only monetary rewards are workable, it has been noted (Jung, Wolfe, and Lipe (21) among others) that other material

rewards, as well as social rewards (e.g., praise), have been used. In a study concerned with professional growth of teachers, Cory (8) found that teachers considered incentives other than salary useful. These additional incentives included among other things: (1) payment of expenses and paid leave to attend conferences, (2) fair and objective evaluation, (3) teacher participation in formulating educational policies, and (4) valid opportunities to work on curriculum revision.

This notion of rewards other than those of salary or of a monetary nature touches on some work reported by Fuller and Miskal (13), who examined a recent industrial theory of work incentives in the context of an educational organization. This work is discussed more fully in Section IV D below. The point here is that rewards in incentive programs may need to be or should be other than monetary and may require that incentive programs be described on the basis of the nature of the reward, as well as on (all or some of) the dimensions suggested above.

2. The Timing of the Reward

A major variable in incentive learning studies is the temporal relationship between the occurrence of desired behavior and receipt of reward. Jung, Lipe, and Wolfe (21, p. 56-59) identified two major models in use with students. One of these was termed the "microincentive" model, the other the "macroincentive" model. The former was characterized by incentives dependent on small increments of student performance; for example, correct responses within a lesson. Under these conditions the time lag from occurrence of desired behavior to receipt of reward is quite short. The latter (macroincentives) is characterized by incentives on very large units of student performance; for example, test gains over a school

to enhance learning.

The two most prominent studies of incentives - the OBO study (29) and the USOE study (1 and 31) both used in essence a macroincentive model.

None of the studies of incentives (excluding student incentive studies) address as an explicit variable the timing of the reward. Where efforts to combine teacher or teacher/parent incentives with student incentives are made, it would seem to be crucial to address the timing of the reward; i.e., micro- or macroincentive model.

In addition in those programs in which the teacher receives the reward (e.g., merit pay) the time lag between results and reward is characteristic of a macroincentive model.

3. Mechanism of Delivery

In discussing modes of delivery for the great variety of student incentive programs, Jung, Lippe, and Wolfe make the point that "the major objective of such (delivery) systems is to link the incentive to the desired student performance." (21, p. 24) All of the example incentive programs couple the reward with the desired behavior in order to elicit the latter. The use of explicit statements, for example, in merit pay plans defining the variables, procedures, and scoring in the evaluation process and the standards of qualification for salary increments is clearly an attempt to couple the reward to the desired behavior.

In nearly all incentive programs the reward is delivered by a superordinate position in the system (e.g., the superintendent) to subordinates in the system (e.g., teachers). Coleman makes the point that there seem to be two ways in which incentives may be provided. One is that just noted; the other is "...through a change in the structure of competition, such that rewards are not based on a superior's evaluation, but on success in a competitive structure...." (7, p. 23) Coleman also suggests that incentives resulting from a change in competitive structure are better accepted than incentives dependent on a superior's evaluation.

In this view, the notion of alternative schools, or alternative means of parental selection of schools - for example, a voucher system - is a fundamentally different way to introduce incentives.

In this context one of the criticisms of the OEO performance contracting study may be viewed in a different light. Saretsky (33) noted that there was a "John Henry" effect; that is, the teachers of the control groups knew that there was a race on, and the control groups performed atypically (better). This suggests that perhaps the competitive structure was altered by the introduction of a potential alternative - namely, performance contracting.

The changes proposed by Johns (20) are dependent on a superior's evaluation; that is, the state evaluating districts. The evaluation, however, is a competitive one; that is, an average level of performance determined by all districts is a baseline which individual districts must exceed to obtain the reward.

This question of the mechanism through which the reward is delivered or obtained may be further complicated in those cases where a strong teachers' union is involved. It is entirely possible that teachers

may perceive or the union may wish to take a posture such that the teachers would perceive, the union as basic to the mechanisms by which their incentives are obtained. In any event, it seems reasonable to believe that this issue of mechanism is an important aspect of incentive programs.

III. A CONCEPTUAL FRAMEWORK

The purpose of this section is to propose a concept for incentive programs as well as a conceptual framework to further investigate incentive programs. In addition, some of the implications of the framework will be examined.

A. The Basic Concept

The previous section examined a number of incentive programs in education. In addition, the word incentive is used by a number of social science disciplines. * It also has a common meaning or usage, generally a reward to be earned as a result of a special effort; or, something which motivates or incites one to action. Within the social sciences the word incentive, while in a few limited cases having some special technical connotations, is consistent with the common usage. Three of the social science usages warrant further discussion.

The first special usage is that by economists in the context of "tax incentives." In this use the general intent of the incentive is to promote or stimulate production or development, usually by providing a tax benefit to business organizations for meeting some special conditions: a reduction or elimination of taxes, for example, for some time period to a new or relocated company in an undeveloped area. Incentives in this context are aimed at organizational entities rather than at individuals.

The second special use is that in psychology, particularly in learning theory where the term is used to "...describe the learning process dependent upon the stimulus-response-goal sequence..." (25, p. 3), where goal is the reward/punishment. This meaning is, of course, the learning paradigm

* Appendix A of this report contains definitions of incentive taken from a variety of sources.

used by the behaviorists and generally serves as the model for studies of incentives in the classrooms. Even in this specialized use of incentive, however, the word is sometimes used to refer to the goal (reward/punishment) itself. As implied by this definition, a negative reward, i.e., punishment, may be used. In such cases the expectation is that attempts will be made to obtain results that will reduce or eliminate the penalty. There is in this definition a coupling between the stimulus/response and the reward.

The third special use of incentive that needs to be considered is that used in contracting. In this context the term "incentive contract" means a contract that specifies a set of individually identifiable, acceptable outcomes and a range of payments, one for each outcome. Two aspects of this usage are important: first, is specification of all acceptable outcomes; that is, all of the outcomes must satisfy in some respect the general goal of the contract; and second, some outcomes are better than others and the better the outcome, the greater the reward.

In summary, all of the usages of incentive involve a reward to be given for some action on achieving some result. In some cases the reward may be offered to organizational entities rather than individuals. There is a coupling of the reward with the behavior required or the results to be obtained. Finally, the reward may have a range of values which may be associated with a range of results. Thus, defining incentive from the usage in the social science disciplines leads to the same considerations as used to examine the several examples of incentive programs in education in the previous section. Considering both the definition of incentive and its use in education, a basic concept of incentive programs may be formulated as follows:

Incentive programs have a goal and offer a reward or set of rewards to individuals or organizations for undertaking certain actions or achieving certain results. These actions or results presumably further the goal, and there is an implicit or explicit association between the reward (s) and the result (s).

This concept may be separated into three parts for the purpose of constructing a conceptual framework. These three parts are analogous to the three characteristics used in the previous section to discuss the example programs; they are:

- (1) The individuals or organizations who may receive the reward
- (2) The goals/results
- (3) The reward.

B. A Conceptual Framework

The conceptual framework proposed herein will hopefully serve three purposes. First, it may serve as a checklist in describing or examining an incentive program. Second, it provides a simple taxonomy for classifying such programs. Finally and most importantly, it may serve as the framework for a systematic, long-range investigation of incentives and incentive programs and their place in the organization and governance of public education in the United States.

1. Targets of Incentive Programs

The targets of incentive programs are defined as the entities that will, under the proper conditions, receive the reward. The targets of an incentive program need to be specifically identified and provide one variable for classifying a program. The first distinction to be made is whether the target is individuals or an organizational entity. Within the

defined by the class or combination of classes of individuals who are the targets. Programs in the other major class, that is with organizational targets, may be further categorized by two considerations: (1) the level of the organizational target and (2) the nature of the change to be sought. The details of this variable of the conceptual framework are outlined below.

A. Individual Targets

1. Superintendent (School System Leader)
2. System Administrative Personnel
3. Principal (School Leader)
4. School Administrative Personnel
5. Teachers
6. Parents
7. Students

B. Organizational Targets

1. Organizational Level
 - a. Individual School
 - b. School District (LFA)
 - c. State
2. Nature of Change
 - a. Organizational (form or size)
 - b. Structural or Operational Change

It is conceivable that a program might have both individual and organizational targets. In this case, of course, both major categories would have to be used either to describe or classify such a program.

2. Goals/Results

The incentive program concept defined above states that the results to be obtained "presumably further the goal" of the program. The implication of this is that the goal and the results are consistent. In this context it may be well to point out that the word results is intended to convey the idea "those conditions which are to be met and for which the reward will be given." This latter idea carries with it an important implication - namely,

that there is a method of determining when conditions have been met; or, in other words, a method of measurement, and equally important that the method is agreed upon by all parties. Thomas and McKinney (43) note that one of the criteria for merit pay plans is consensus by the participants on the state-of-the-art and tools and techniques required for performance measurement. Templeton (36) states that one of the major criticisms of merit pay plans is the lack of objective standards for teacher ratings.

All incentive programs are based on the assumption that at least one procedure (method or technique) exists, which, if used, will obtain the desired results. This is so, even in those cases where the procedure is either not spelled out or is left to the choice of the targets of the program. For example, Carpenter and Hall (4) conclude that in the cases of performance contracting studies for their report, in all cases the contractors were to be paid for results and chose individualized instructional techniques as the preferred methodology. The OEO study of performance contracting left the choice of method to the contractors or, in the case of the incentive only portion of the study, to the teachers. Miller (28) has stated that this exclusion of method as an explicit variable was a serious omission in the research design.

The foregoing discussion leads to the conclusion that there are four aspects or characteristics of incentive programs which need to be considered. These characteristics are: (1) goals, (2) procedure, (3) results, and (4) measurement. Finally, in considering these characteristics of incentive programs as applied to education, the concept of education as a system with domains of inputs, processes, and outputs will be used.

This goals/results variable of the conceptual framework dealing with the characteristics of incentive programs and their relationship to the educational system may best be defined by a matrix, with one dimension the program characteristics and the other the domain of the system, as shown below:

Incentive Program Characteristic	Domain of Educational System		
	Input (i)	Process (p)	Output (o)
Goal (G)	G_i	G_p	G_o
Procedure (P)	P_i	P_p	-
Results (R)	R_i	R_p	R_o
Measurement (M)	M_i	M_p	M_o

The foregoing matrix permits clarification or extension of some of the concepts discussed above. First, it has been suggested that the goals and results ought to be consistent. It follows that the measurement must also be consistent. This may now be restated - "the goals, results, and measurement method must all be in the same domain." Second, a complete program requires that all four of the characteristics must be specified. It may be in some cases that the choice of method is to be left to the targets. Such a degree of freedom should be duly noted as an aspect of the particular program.

Finally, it should be noted that in the cell of the matrix formed by the intersection of procedure and output there is no entry. It will be recalled that procedure is the method used to bring about the desired results;

consequently, such a cell may not contain an entry as no method for output can exist. Further, if the input/process/output dimension is considered to be a sequence, then the procedure must not be later in the sequence than the goals/results/measurement entries. This implies that if one wishes to alter output, then either the inputs to the system or the processes used by the system must be altered. If the goal is to change an input, then the procedures must be from the set that is used to determine system inputs.

The Title I program described in Appendix B and cited earlier in this paper had as a goal the improvement of educational programs for the educationally deprived at the level of the school district (LEA). The incentive grants, however, were given on the basis of funding considerations to the states for subsequent distribution to the districts. This program would be thus classified as an organizational target (the LEA) with goals in the process domain but with results (conditions for reward) in the input domain and with reward distribution dependent on the mechanism of a superordinate and partially dependent on the actions of an organizational level (state applications) different from the target. As defined by this (the goals/results) variable of the conceptual framework, the Title I program would be considered to be an inconsistent program on the basis of having goals in one domain and results in another. There is also an element of inconsistency in having two levels of organizational targets, the state and the LEA's.

The USOE "Incentives in Education" project, which did not deal explicitly with the instructional methodology (procedure) to be used to improve student learning (output goal), would be defined as an incomplete program.

3. Reward

The final variable of the conceptual framework is to use the characteristic of the reward to describe or classify incentive programs. Three characteristics of reward are used to distinguish among incentive programs. These three characteristics are: (1) the nature of the reward, (2) the mechanism of delivery, and (3) the timing. Each of these primary characteristics is further subdivided.

The nature of the reward is distinguished on two dimensions. First, whether it is a monetary or some other form of reward, and second, whether the reward is given individually or on a group basis.

The mechanism of delivery uses only two subdivisions: whether the reward is determined by a superordinate in the system or whether there is a change in the competitive structure.

Finally, the timing characteristic has two subcategories. These categories follow the notion of the microincentive or macroincentive models defined by Jung, Lipe, and Wolfe. (21)

It is envisioned that this characteristic be used when a student incentive model is combined with one of the other individual target models. Current practice and research on teacher incentive programs use exclusively a macroincentive model. While it may be argued that this is the only practical approach when financial incentives are used, development of alternative reward models (see IV D below) may show that microincentive models with teachers or other personnel are possible.

The details of this variable are outlined below:

A. Nature of Reward

Type	Basis	
	Individually	Group
Money		
Other		

B. Mechanism

1. Superordinate
2. Change in competitive structure

C. Timing

1. Microincentive
2. Macroincentive

IV. CONCLUSIONS AND RECOMMENDATIONS

A. Need for a Framework

In all cases incentives generally are taken to mean the reward to be given/received as a consequence of a prespecified behavior or achieving a prespecified standard. In spite of this common (and common sense) meaning, the most striking characteristic of incentive use is the vast variety of and differences among programs which fall under the incentive rubric. This diversity (yet commonness) results in some confusion in discussing or considering incentive programs and research on incentive programs.

If one accepts the general definition of incentive, the wide variety is not only justifiable but inevitable for two reasons. First, there are a great number of places within the educational system where incentives may be applied. Second, it is not likely that economists, sociologists, and psychologists, for example, who all use incentive in their respective disciplines, will jointly agree on new and/or different words. As the various disciplines attack problems in education, it is more probable that the terms and their meanings of the different disciplines will be used in an educational context.

There is a conspicuous lack of an overall conceptual approach which provides a framework for a systematic investigation of incentives in education. Although it does not seem to have been implemented, Jung, Lipe, and Wolfe (21) did suggest a general framework for incentive programs targeted at individuals. The programs they were concerned with were generally limited to those in which student learning (output domain) was the criterion variable. As suggested in this paper, such incentive programs comprise only one category among many.

It seems clear that a framework is needed. It is strongly urged that a conceptual framework, whether it be the one suggested in this paper, a variation thereof, or a new and completely different one should be established. The framework should meet, in as far as is possible, the following general criteria:

- (1) Permit the categorizing of incentive programs with a minimum of overlap and ambiguity.
- (2) Provide for identification of those categories of incentive programs and facets thereof of most interest for further exploration and/or research.
- (3) Provide guidance to systematic exploration of programs of utmost interest.

B. Objectives and Measurement Problem

Many, if not all, of the advocates of incentives mean the word to be applied to those cases where outcomes of the educational system (e.g., student learning) are the desiderata, and for which rewards will be made. This view is generally consistent with the position that incentives may be considered to be an aspect of accountability. More generally, however, incentives need not be applied only to outcomes of the educational system, although the behavior or state for which the reward will be given must be objectively assessable. This requirement brings the measurement problem and the related issue of goals or objectives specification into sharp focus. In particular, those incentive programs for which educational systems outcomes are the criteria are crucially dependent on resolving two issues. First, the specification of educational objectives and second, adequate or acceptable measurement instruments.

Jung, Lipe, and Wolfe (21, p. 3) raise three questions:

- (1) Can educational goals be identified which are significant yet provide suitable criteria for incentives?
- (2) Will major parties in the educational process allow external incentives contingent upon the attainment of such goals?
- (3) Can incentives be more effective than existing programs in goal attainment?

Thomas and McKinney (43), who articulate the view that merit pay (and incentives generally) may be viewed as part of accountability, identify several criteria relative to accountability plans. (43, p. 39 & 40) These criteria include:

- (1) Agreement on the objectives of the plan
- (2) State-of-the-art, including participants consensus relative thereto, on the tools and techniques of the required performance measurement
- (3) Willingness of the stakeholders (i.e., major parties in the educational process) to participate.

Stucker and Hall (39) state that program/product specification and objective measurement of performance are essential to performance (i.e., incentive) contracting. They review several statements of educational goals and objectives and suggest their general inadequacy for a performance contract.

Templeton states that one of the major criticisms of merit pay plans is that there are no objective standards available for teacher rating. (42, p. 2)

Stake (31) reviewed and analyzed the problems of testing in performance contracting. His analysis of the hazards and pitfalls in that context is applicable to any incentive program which depends on assessment of educational system outputs. Cohn and Millman (6) note that before one can provide incentives to schools for more or better output, a specification of that output and its measurement are necessary and propose that a start may be made.

In essence, Cohn and Millman (6), while admitting the state-of-the-art is far from satisfactory, propose an overall index measure of education output, combining several separate indicators of output. The formulation they present is the notion of a generalized educational production function in which a set of educational objectives (i.e., outputs) is a function of the interaction of a set of educational inputs (e.g., budget) with a set of non-school factors (e.g., family Socio Economic Status). They give a specific example of how such an approach might be employed using data from Kuhns. (22) While this formulation provides an approach to the problem of a generalized output measure, it is limited to secondary schools. More importantly, it does not resolve the question of agreement to objectives or adequate measurement instruments.

In summary, the specification of objectives and the demonstrated means of measuring them, both crucial to incentive programs dealing with educational system outputs, are far from satisfactory.

C. Lack of Theory

Work on incentives to date has had a minimal theoretical foundation undergirding both practice and research. Jung, Lipe, and Wolfe (21) as noted earlier distinguish between two student incentive models - the microincentive and macroincentive - and point out that the latter has almost no research history. It may be argued that the microincentive model is the behavioral psychologist's learning paradigm as applied to the school situation, and, as such, has a theoretical basis, whereas the macroincentive model does not. It is the latter model, however, which has been used in the most publicized studies of incentives in learning, including teacher incentive programs.

A macroincentive model, it will be recalled, usually involves a considerable delay between the results (occurrence of desired behavior) and receipt of reward. A merit pay plan, for example, might use observation of teacher performance as a measure in 1 year and a salary increment, in monthly installments (as a reward) in the following year. Theoretical formulations regarding incentives in learning psychology do not typically cover such extended delays between behavior and reward. Theorizing about such a model would, it seems, suggest invoking such notions as "internalized value systems" or "delayed gratification concepts." No such theoretical formulation as applied to incentive programs has yet been done.

The lack of a theoretical basis may be noted elsewhere. Stucker reviewed the major theoretical articles bearing on performance contracting and states "no general definitive statement of that theory has been found, but most of the major elements of the theory are presented." (8) Stucker then summarized the two articles he deemed most pertinent: one by Simon (30) and one by Yowell. (47) According to Stucker, Simon's work is concerned with sales contracts (contracts for results) and employment contracts (contracts

for labor resources) and the trade-offs between them. Stucker suggests Simon's discussion may be rephrased to deal with fixed or performance contracts.

Stucker's review of Yowell's work makes the following points:

- (1) It is a general discussion - theoretic model.
- (2) It refers to only two parties, a principal and an agent.
- (3) It assumes the relationship is established for the benefit of both.
- (4) It focuses on the ways a principal (employer) attempts to guide the actions of an agent (employer or contractor).
- (5) It examines the extent to which the principal can guide the agent by rewards conditional on the agent's results.
- (6) It assumes the agent will try to maximize his results.

In this context of theory two other approaches may be mentioned. These approaches deal with the relationship of individuals to organizations. The first is March and Simon's concept of "inducements and contributions." (26) The second is Etzioni's concept of "compliance." (11) These two formulations suggest alternative ways of conceptualizing the mechanisms of reward/punishment in an organizational context.

In summary, there are several theoretical approaches which bear on the use of incentives in education. It would appear that a major issue is to rationalize these alternative theoretical formulations.

An effort to examine the various theories (some of which have been identified in this paper) that apply to the use of incentives should be undertaken. Some of the steps in such an effort should be:

- (1) A mapping (that is, where and how they apply) of the various theories onto the conceptual framework should be attempted
- (2) Such a mapping if at least partially successful should yield information on:
 - (a) Improvement of the conceptual framework
 - (b) Research areas where minimal or no theory is available
 - (c) Overlaps and gaps among the theories
- (3) An attempt to extend, expand, or clarify theories to account for overlaps and gaps.

D. Boundary Problems

Some of the issues and problems of both practice and research on incentives are also problems in other areas of education. A good example of such a problem is evaluation and measurement which arises in a variety of ways in almost all areas of education. Another example is that of student incentive models, of special interest in learning studies in educational research, which may be combined with various of the individual target incentive programs.

A third example, but of a different kind, is that of "differentiated staffing." As noted earlier, Thomas and McKinney (43) consider differentiated staffing to be a variation of merit pay plans. Differentiated staffing plans, however, not only involve differential pay but also differential teacher roles. One of the proposed patterns of differential staffing is a hierarchical structure. For example, the "Clark" plan proposed for Washington, D.C. and the Temple City, California plan are of this type. Although it is true that American

public elementary and secondary schools are in general hierarchies, this concept of differentiated staffing extends the hierarchy to the point of teacher/student interaction. Although some organizational theorists have considered hierarchies in bureaucracy, little or no conceptual work regarding the place or impact of a teacher hierarchy in the educational milieu has been done. Although differentiated staffing may be studied as an incentive program, it seems equally, if not more important, for differentiated staffing to be studied from an organization factors point of view.

E. Alternative Rewards

Although student incentive studies have used a variety of rewards, those incentive programs for school personnel, both operational and experimental, have used exclusively monetary rewards. One study, Hooker and Summerfield (18), compared professional growth patterns of teachers from high incentive with teachers from low incentive districts. In this study the incentive aspects were salary schedules based on experience and academic preparation. Their results seemed to indicate that the amount of incentive had little if any effect on the number of advanced credits taken by teachers. Their findings do indicate that perhaps other more pervasive and subtle incentives, sex role expectations (e.g., males as school administrators), for example, were involved.

As noted earlier, Cory (8) identified rewards other than monetary which both teachers and principals thought valuable in providing incentives to professional growth. A paper by Fuller and Miskel (13) bears directly on this problem. They examined in an educational context a recently-developed industrial theory. This theory uses the concept of sources of work attachment;

that is, features of the work environment to which human behavior is directly related.

The idea is to find which features of work attachment are sources of satisfaction/dissatisfaction and relate incentive thereto. Fuller and Miskel used a questionnaire of 124 items (falling into 8 categories) of sources of work attachment. Each item had three responses: satisfied, indifferent, and dissatisfied. The questionnaire was administered to 508 staff members in one school district. It was found that although all teachers responded to certain work features in similar ways, three distinct groupings of teachers (satisfied, indifferent, and dissatisfied) also responded differently to other work features. Fuller and Miskel suggest that an incentive plan which provides for one set of incentives in common and three different sets of incentives for the three groups of teachers may be indicated.

In view of some of the studies which seem to indicate the questionability of monetary incentives to teachers, a more thorough exploration of alternative rewards seems indicated.

F. State-of-the-Art

Incentive programs in education do not meet reasonable standards of experimental studies, in the sense that Campbell and Stanley (3) define the criteria of experimental or quasi-experimental studies. The most widely publicized use of incentives - the OFO performance contracting study - has been sharply criticized by Miller (26) as having been a failure in experimentation. The USOE study "Incentives in Education" (see 1 and 31) also lacked the rigor required of an experiment. Both of these studies, for example, lacked randomization for key features of the design and in addition, focused primarily on under-achieving, disadvantaged students. Thus, although both studies report conclusions on the value of incentives, it may be the case

that these conclusions are not even generalizable to other disadvantaged students, let alone to the general public school population.

There seem to have been no experimental studies undertaken or designed to examine or permit generalization to individuals other than students. In no sense was either the OFO or the USOE study designed in such a way as to be generalized to teachers. Certainly there are a minimum of programs applying incentives to principals and administrators in the system.

Those programs focusing on organizational entities not only have not been examined in an experimental context, but there is also a lack of case studies.

Although case studies lack the rigor of experiments, they may serve to provide insight to important variables of the problem. In addition, case studies may serve as preexperimental vehicles for examining theoretical or conceptual formulations of the problem.

Considering the state of experimentation on incentives, the situation with regard to theoretical foundation for incentive programs, and the general lack of a well-documented and organized body of knowledge about incentives in education as broadly conceived as in this paper, then a group of well-done case studies may be the best starting point.

Assuming that a conceptual framework is adopted as suggested above, it would be useful to undertake a series of case studies including the use of field methods such as participant-observation and micro-ethnography, for example, aimed at documenting as many of the categories of the framework as possible.

APPENDIX A

SOME DEFINITIONS OF INCENTIVE

I. COMMON USAGE

In common usage incentive is generally a special reward which encourages people to special or extra effort. The dictionary (38) defines it as:

1. (adj) Inciting; encouraging or moving; rousing to action; stimulative.
2. (n) That which incites or has a tendency to incite, to determination or action; motive, money and pride are incentives to action.

Synonyms include: goal, stimulus, and inducement

II. ECONOMICS

As used in economics, the meaning is consistent with the common usage except that the reward is generally monetary in nature. For example, Hanson (17) gives the following definitions:

Incentives 1. With reference to wages, a system of wage payments which offers an inducement in the form of a bonus to encourage workers to maintain a high level of output. Opportunity of promotion is another type of incentive ...

2. With reference to the taxation of wages and profits, it means a tax system designed to encourage an expansion of output.

These definitions are consistent with others offered in dictionaries of economics; for example, Greenwald (16) and Sloan and Zurcher. (35) In the same general vein as tax incentives is the use of incentives to aid underdeveloped areas. These incentives often, although not always, include a taxation structure which favors a new (or expanded) company during its initial years. Incentives in this context are generally aimed at organizational entities, rather than individuals.

III. PSYCHOLOGY

In modern psychology incentive is generally limited to an aspect of learning having to do with a reward/punishment following a response. For example, Logan and Wagner (25, p. 3) define the concept of incentive as:

... The term incentive is here used to describe the learning process dependent upon the stimulus-response-goal sequence. ... Incentive is most analogous to what in everyday language might be called an expectation that reward and punishment will follow a response ... The term incentive is also widely used to refer to the reward itself especially when the reward is visible to the subject. Incentive is here reserved for the learning process dependent on reward or punishment because the important thing is for the reward to become internalized;

Psychological Abstracts lists incentive in its index with the note "see also Motivation, Reward, Reinforcement."

The word incentive is, of course, much used by the behaviorists since they use the stimulus-response-goal learning paradigm.

Industrial psychologists use incentive generally in the context of monetary reward in the sense of the economists' incentive wage systems.

IV. SOCIOLOGY

Sociologists generally follow the definition used by psychologists. Hoult (19) defines incentive under "motive (motivation)."

In the general sense any condition of an organism promoting selective activity ... in modern behavioral psychology all determiners of behavior ... in the social sciences often used synonymously with incentive

V. CONTRACTING

Stucker, in writing on performance contracting in education, states (38): "Contracts that allow for a range of acceptable outcomes and specify a range of payments corresponding to these outcomes are termed performance or

incentive contracts." Stucker also cites a paper by Yowell (47) which defines incentive as:

Incentive: A conditional reward provided only if some stated result is achieved. 'You will be rewarded with A only if you accomplish B.'

VI. EDUCATION

In education, incentive is used in ways consistent with the foregoing definitions. For example, Good (15) gives the following definition generally consistent with economists' usage.

pay, incentive rate of (school administration) the percentage of rate above base pay that should be earned by the average employee who has been properly selected and trained for his work, when he meets a fair standard of performance.

Also in Good (15):

incentives, the factors and forces that incite or motivate one to action.

The latter, of course, being more the common usage and generally consistent with the use in psychology.

The Education Index lists under incentives primarily incentive pay systems and provides a cross-reference to "reward and punishment." The ERIC subject index lists incentive grants and incentive systems. The former generally has to do with distribution of state aid; the latter with classroom learning, and some of these using a behavioral approach to classroom learning.

VII. SUMMARY OF DEFINITIONS

Nearly all of the definitions given above are but application of the common meaning in a special context; e.g., economics. The exception seems to be in the use by behavioral psychologists to mean the concept of stimulus-response-goal (reward/punishment), but even here incentive is often used to mean the reward (punishment).

APPENDIX B

EXAMPLES OF INCENTIVE PROGRAMS IN EDUCATION

This appendix describes several incentive programs as examples of applications in education. The appendix is organized on the basis of the conceptual framework proposed and discussed in Section III. The first division is made on the basis of whether the program has an individual or organizational target. Programs having organizational targets are further subdivided on the basis of the nature of the change sought - either a change to organization or a change to operation of structure.

Programs having individual targets are organized by the portion of the educational system domain (input, process, output) which contains the program goal.

Each program is described in terms of the goal, the procedure, the measurement, and the reward, and finally described briefly in accordance with the conceptual framework.

I. ORGANIZATIONAL TARGETS

A. Organizational Change

During the last half century one of the prime movements in American public education has been the movement toward more and larger comprehensively-organized school districts; that is, districts which offer K-12 or 1-12 grades under a central administration. The first example presented in this section is of the current California statewide program to promote the formation of comprehensively organized school districts.

Cohn and Millman (6, p. 88) state: "considerable evidence demonstrating the existence of substantial scale economies in public (especially secondary) schools has been presented in recent years..." and

go on to suggest that changes in size of schools (school districts) ought to affect economies of scale, i.e., per pupil cost relative to size. The second example is of a program proposed by Cohn and Millman to modify school organization to affect economies of scale.

1. California Incentive Program for Unified School Districts

In the State of California, comprehensive districts are called unified school districts. The California Education Code of 1959, as amended through 1972, encourages the formation of unified school districts throughout the state and specifies: (1) certain procedures to be followed, (2) a means of assessing conformance, and (3) a monetary reward.

a. Goal. The California Education Code (45) in Division 5, Chapter 10, Article 1, Section 3100 states (in part):

Legislative intent -

It is the intent and purpose ... this division be utilized primarily for the formation of unified school districts and that this form of organization be ultimately adopted throughout the state.

Section 3131.5 provides further evidence of the goal as it includes the following:

In order to establish a system of unified districts throughout the state, (appropriately approved plans) * shall supersede any organization or reorganization accomplished under other provisions of this code.

b. Procedure. Division 5, Chapters 1-10, Articles 1601-3587 of the California Education Code (45) deals with organization and

* Words in brackets paraphrase provisions of the section.

reorganization of school districts and establishes the procedures to be followed. The procedures for forming unified school districts include:

- (1) The establishment of county committees
- (2) The development of county-wide or in some cases multi-county plans
- (3) Voter approval of such plans
- (4) Voter approval within the affected districts of each new proposed unified district
- (5) Submission of plans to and approval or disapproval thereof by the State Board of Education
- (6) Provisions for plans to be made at the state level if the local areas do not do so.

c. Measurement. The various aspects of the unification process are administered by the State Superintendent of Public Instruction (Chapter 9, Section 3001) in accordance with rules and regulations of the State Board of Education (Chapter 9, Section 3002). Criteria for the formation of unified districts are established by Section 3100 and include among other provisions:

- (1) Adequate enrollment
- (2) Adequate financially
- (3) Substantial community identity
- (4) Does not promote racial or ethnic discrimination.

d. Reward. Division 14, Chapter 2, Article 2.1, Sections 17671 and 17677 provides for additional state aid for those districts in conformance with the provisions of Division 5, Chapters 9 and 10 as determined by the State Board and certified by the Superintendent of Public Instruction. Under these articles each district must have an average daily attendance (ADA) of not less than 2,000. The additional aid is \$20.00/ADA. The 1969 amendments to the code provide for a foundation program of \$755/ADA for elementary school pupils and \$950/ADA for secondary pupils. The incentive aid is about 2.6 percent for elementary pupils and 2.1 percent for secondary pupils. Since plans for unified districts may be made at the state level if the local areas fail to do so, there is also a punishment; i.e., loss of local control.

e. Conceptual Framework Discussion. This program is targeted at an organizational entity - the school district - and seeking a change in organization form. The goals, procedures, results, and measurements are all in the input domain. Finally, a monetary reward, paid individually on the basis of a superordinate mechanism, is used.

2. Proposed Economics of Scale

As noted earlier, Cohn and Millman (6) suggest that proper size of school districts may result in economies of scale. In discussing this issue they note that "... most of the studies indicate a

U-shaped relationship between per pupil cost and school size, measured by enrollment. It follows that most schools are either too large or too small (p. 89) Their report goes on to note, however, that there is some indication that U-shaped relationships may not be accurate, and that it is possible that costs might decrease indefinitely as school size increase. (p. 91) Nevertheless, they assume the U-shaped relationship in proposing a program of promoting economies of scale.

a. Goal. The objective would be to promote school organization to obtain optimal-sized school districts. Cohn and Millman state "an explicit incentive structure in the state aid process would not only provide a certain degree of stimulus to change school organization but would also serve to focus attention on the scale issue." (6, p. 88/89)

Three options are proposed: (1) A penalty factor, (2) An incentive payment for schools which take action to improve their cost posture, and (3) A combination of penalty and incentive. For purposes of example, only the first option (penalty factor) will be considered.

b. Procedure. The procedure involves the assumption that there is a determinable optimal-sized school district. A study by Cohn is cited in which he found that a school of 1,653 (pupils in ADA) was the optimal size relative to per pupil cost. In essence, schools both larger and smaller than optimum would have greater per pupil costs.

The procedure involves determining a penalty factor - PF - which is based upon:

- (1) The unit cost (C_m) for the optimal sized school district
- (2) The adjusted unit cost (C_i) for each school district
- (3) A scale factor (p) between 0-1 determined by the state legislature

such that:

$PF = p (C_i - C_m)$ would be the penalty factor for the i th school district. Obviously, the larger the p , the larger the PF. The unit costs could consider a variety of factors such as:

- (1) Average number of hours college semester hours per teaching assignment
- (2) Class size
- (3) Building value per ADA
- (4) Number of credit units offered
- (5) Median high school teacher salary
- (6) Bonded indebtedness per ADA
- (7) Average number of different subject matter assignments per high school teacher.

c. Measurement. The measurement would be straightforward, based upon school district reports containing the data necessary to compute the various costs and establish the cost of the optimum-

sized school. These data would also include school size - pupil enrollment in ADA.

d. Reward. In this case the reward is to be obtained by moving toward optimum size and reducing the penalty to be incurred. In operation, the penalty factor (PF) is used to reduce state aid by multiplying the PF by enrollment - pupils in ADA (E) and subtracting the result from the state aid (A_i) for the district:

$A_{adj_i} = A_i - (PF \cdot E)$ is the adjusted state aid for the i th district.

Thus, if state aid were given on an ADA basis, say \$600/ADA and the PF for a specific district were say \$30.00/ADA, the district would receive only \$570/ADA or be penalized 5 percent of its aid monies.

e. Conceptual Framework Discussion. Although this program is targeted at an organizational entity, the precise target is not clear. The target is limited to the secondary level, but whether it is individual schools or districts is not clear. The program is seeking a change in organization, specifically in size. The goals, procedures, results, and measurements are all in the input domain. The reward is monetary, paid individually, through a change in competitive structure but involving a superordinate mechanism.

B. Structural or Operational Change

Two examples of incentive programs to modify operation of public education are given. The first example was a proposal to modify the method of distributing state aid based upon considering the relationship between school districts effort required to support a minimum education program and its actual efforts. The second example deals with an effort to modify the emphasis which schools place upon education of certain educationally disadvantaged students.

1. Ratio of actual effort/minimum effort as a mechanism to distribute state aid

Johns (20) proposed to modify the Florida State Aid Program, a foundation program, by providing a portion of state monies by comparing the ratio of local (district) actual effort to support education in relation to the local effort required for a minimum program with state average ratio of actual effort to minimum effort. This proposal to affect distribution of state aid monies differs from the Cohn and Millman proposal. The latter were directly concerned with affecting organization, whereas here the concern is with structure; that is, the mechanism or operation of local (district) support of education.

Johns makes clear that an incentive program such as he proposes must be developed in the context of a particular state and its aid program. The example which follows is taken directly from Johns' incentive program development for the State of Florida.

a. Goal. The goal is based on the belief that education must now go beyond minimum requirements.

Johns states:

The original purpose of the foundation program ... was to guarantee a minimum education program ... It is now believed

that the state (must provide) financial incentives for school districts to provide more than a minimum program" (20, p. 4)

The goal is then stated succinctly:

The purpose of this incentive grant is to give additional state financial help to those districts that are willing to help themselves financially. (20, p. 9)

- b. Procedure. The procedure involves having the legislature establish state aid in two categories: (1) a foundation grant to be in accordance with existing laws and (2) an incentive grant to be given to those which exert an effort beyond that required for the minimum foundation program. The procedure also requires obtaining appropriate data from the districts and computing appropriate ratios.
- c. Measurement. The measurement is basically a mechanical process depending on data supplied by the districts. The computations involve:

- (1) Determining for each district the minimum tax effort required to support the Minimum Foundation Program (T_m)
- (2) Determining local (district) tax effort (T_d)
- (3) Computing the local ratio $R_d = \frac{T_d}{T_m}$
- (4) Computing the state average ratio $\bar{R}_s = \frac{\sum_{i=1}^n R_d}{n}$
- (5) Computing district multiplier $\eta_m = R_d$
 if $\eta_m > 1.0$ district is average \bar{R}_s
 or above in effort.

d. Reward. The actual reward would depend on the amount established by the state. The computations are comparatively simple.

(1) Compute the base amount of the incentive grant (G_b), in Florida the number of instructional units (L_u) in the Minimum Foundation Program multiplied by the incentive aid (A_I) per L_u $G_b = L_u A_I$

(2) Compute the actual incentive grant (G_I) by multiplying the G_b by the η_m $G_I = G_b \eta_m$

Johns establishes limits on both \bar{R}_s and η_m ; in the latter case, an upper bound ($\eta_m \leq 1.100$) means that local effort up to but not beyond 10 percent of the state average would be rewarded.

Johns make a series of assumptions including that $A_I = \$600$ and that foundation aid per $L_u = \$400$ and computes an example if the 1965-66 funds were distributed in accordance with his proposal. The data below are taken from his Tables 2 and 3. These data show: in Col. 1 three districts - the one with highest η_m , the one closest to the state average, and the one with the lowest η_m ; in Col. 2 the respective η_m ; in Col. 3 the incentive grant; in Col. 4 the amount of minimum foundation program grant; in Col. 5 the total grant; and in Col. 6 the grant which would have been given to the district if

all funds were distributed as foundation grants.

<u>Col. 1</u>	<u>Col. 2</u>	<u>Col. 3</u>	<u>Col. 4</u>	<u>Col. 5</u>	<u>Col. 6</u>
District	D_m	G_I	G_f	Total	If all aid were G_f
H	1.452	76,560	46,400	122,960	116,000
M	.997	369,688	247,200	616,888	618,000
L	.262	5,502	14,000	19,502	35,000

Because of the upper bound ($D_m \leq 1.100$) and no lower bound, the program appears to have more of a penalty characteristic than a reward characteristic.

e. Conceptual Framework Discussion. This program has the school district as the organizational target. The nature of the change that is sought is in structural mechanisms through which the local support for education is determined. The goal, procedure, results, and measurement are all in the input domain. A monetary reward, paid individually, through a change in competitive structure but involving the mechanism of a superordinate, is used.

2. Meeting the needs of educationally deprived children

a. Goal. Title I of the Elementary and Secondary Education Act of 1965 provided Federal assistance to local education agencies to improve educational programs for children of low-income families.

Section 101 of the act states (in part): "... The Congress hereby declares it to be the policy of the United States to provide financial assistance ... to expand and improve their educational program ... to

meeting the special educational needs of educationally deprived children." (9)

In 1970 Part B, providing for special incentive grants to be awarded, became effective. (30) The purpose for which money provided under special incentive grants was to be used is clear. (Section 122 of Part B states (in part): "(2) (funds granted) used ... to meet the special educational needs of educationally deprived children." (9)

b. Procedure. The procedure includes the determination of individual state indices and a national index of effort. The indices of effort are ratios (expressed in percents) of expenditures of all non-Federal money spent on public elementary and secondary education to total personal income. For the individual states the calculations are done on state expenditures and personal income within the state; the national index on the totals of all states. Those states whose indices exceed the national index are entitled to a special incentive grant.

The states, however, are required to make application for the special incentive grants and to include appropriate assurances that the funds received will be made available to local educational agencies and will be used to meet the educational needs of educationally-deprived children.

c. Measurement. Little or no assessment is required - the basic measures being the computation of the effort indices and the determination of the number of qualified children, which is determined in any event for the purpose of the basic grants to local educational agencies.

d. Reward. Those states whose effort indices exceed the national effort index are entitled to receive a special incentive grant. The amount is dependent upon the extent to which the state index exceeds the national index and the number of low-income children in the state. A state may receive \$1.00 per child for each .01 percent by which the state index exceeds the national index.

Note that although the special incentive grants are given to support compensatory education, the basis of reward is total educational expenditures. This has been criticized, for example, by Wilensky (40) as an inappropriate use of incentives to promote compensatory education and also on the basis that individual districts can do little to contribute to the state index.

e. Conceptual Framework Discussion. This program is targeted at the local educational agency (i. e., school district) but involves the state as an intermediary. The goal is in the process domain, but the results and measurement are in the input domain.

The monetary reward is paid on a group basis (to the state for subsequent distribution) through a competitive structure, but involving the actions of a superordinate. On the basis of the disparity of the goals and results, this must be considered to be an inconsistent program.

II. INDIVIDUAL TARGETS

The incentive programs which have received the most attention are those which have been directed toward the personnel in the educational system. These programs have included special contracts to test incentives only as well as attempts to introduce merit pay systems. Programs in the latter category have raised considerable controversy because they have emphasized achievement, usually academic, by the students as a basis of the reward. Using the input/process/output matrix, however, it may be argued that a salary schedule in the more traditional vein based on both preparation and longevity is also an incentive program. In this section examples of incentive programs for school personnel are given.

A. Input Domain

A case reported by Chaplin (5) is used here as the first example of incentive programs for school personnel.

1. Goal

The basic goal is to promote continuing professional growth where professional growth is, for the purposes of the plan, synonymous with additional academic preparation up to the MA + 18 units.

In addition, a special aspect of the program (Project LEAP - Leadership in Education Advancement Program) provides for rewards beyond the last academic preparation step (MA + 18). The decision to take and complete additional academic work is entirely at the discretion of the individual teachers.

The salary schedule has two dimensions: (1) seven steps of academic accomplishment (Step 1 - BA through

Step 7 = MA + 18) and (2) longevity with one annual increment at Step 1 and 10 annual increments at Step 7.

2. Procedure

The procedure is quite simple. For the basic schedule the teacher takes additional academic work.

For Project LEAP the teacher must complete a project which enhances the educational program of the district (Hartford, Wisc., Union High School). The projects must be approved in advance and completed satisfactorily.

3. Measurement

The academic aspects of the program are practically self-administering, with the teacher required only to present evidence of satisfactory completion of college-level course work.

For Project LEAP the administration must approve the project in advance and must review it for satisfactory completion. Project LEAP increments are given only for those projects which, in the judgment of the Administration, enhance the educational program of the district.

4. Reward

Completion of the proper number of academic credits moves a teacher from one step (for example, BA) to the next step (for example, BA + 8 units); the differential at the first annual increment between any two adjacent steps is 5 percent. In addition, each higher step has more annual increments than the preceding steps, thus

carrying the additional incentive of more salary for more longevity. On the other hand, there is a distinct penalty (an immediate upper bound on salary) if a teacher elects not to continue with academic work.

For Project LEAP (teachers at the highest step - MA + 18) the rewards range from \$200 to \$400 and become a permanent part of the teacher's pay. Only one project may be carried out each year, although there is no limit on the number of projects.

5. Conceptual Framework Discussion

This program has an individual target - the teacher. The goals, procedures, results, and measurement are all in the input domain. A monetary reward is paid individually through a superordinate mechanism.

B. Process Domain

Thomas and McKinney (43) treat incentive or merit pay plans as one of several possible programs that are part of the accountability movement. They point out that:

The incentive pay plans advocated today seek to replace or supplement a salary schedule based on education and longevity with a plan that provides rewards to teachers commensurate with performance. (43, p. 40)

The usual incentive is a salary differential generally awarded for superior performance in the standard teacher role. In this context superior performance is intended to be determined by measures of student achievement or perhaps classroom observation. The most important variation according to Thomas and McKinney is differentiated staffing.

Differentiated staffing generally provides not only for differential roles for teachers but also for differential pay according to the role. (48) Within any one role, however, there is usually not a differential pay based on student achievement, which is, as noted above, supposed to be a prime factor of merit pay plans. Rhodes and Kaplan (32) include descriptions of 11 merit pay plans, none of which seems to have as a feature the measurement of student achievement as a prime or even partial indicator for determining reward.

The following example, taken from Rhodes and Kaplan (32, p. 72-75) although using differentiated titles does not apparently provide for differentiated roles and is more correctly termed a "merit-plan."

1. Goal

This plan provides for teachers to be placed on three schedules: (1) basic, (2) career placement, and (3) master placement. The purpose of using varying schedules is as Rhodes and Kaplan quote from the school district handbook to "recognize the quality of teacher training and experience."

2. Procedure

Each of the three schedules provides for academic preparation (BA, MA, or equivalent, and MA + 30) and for up to 15 years' experience. The Basic Schedule is for new (probationary) teachers and tenure teachers who are evaluated as satisfactory. The Career Placement Schedule is for probationary teachers with at least 4 years' experience (2 in the district) and for tenure

teachers. Transfer from the basic to the Career Placement Schedule also requires a valid teaching certificate, professional growth evidenced by at least 6 hours' (or equivalent) of graduate work, and evaluation rating of at least above satisfactory.

The Master Placement Schedule is for tenure teachers or probationary with 5 years of experience (2 in the district). Also required are: (1) an MA and valid certificate, (2) professional growth, and (3) evaluation of outstanding.

Note that although BA is shown on three schedules, the requirements as stated above require an MA for the Master Placement Schedule.

Evaluation is done by the administrative and supervisory staff for all teachers as they become eligible and each 2 years thereafter. Written evaluation forms are used and reviewed with the teachers, who have the right of appeal. Final decision as to schedule placement rests with the Board of Education.

3. Measurement

Teachers are evaluated on five factors: (1) personal fitness for teaching, (2) classroom effectiveness (the major criterion), (3) relationship with students, (4) relationship with parents, and (5) relationship with staff. Each factor is rated on a five-point scale: (1) outstanding, (2) excellent, (3) above satisfactory,

(4) satisfactory, (5) needs improvement. Evaluation is done in accordance with a written guide.

4. Reward

Teachers who are placed on the Career Placement Schedule receive an initial increment of \$600 and subsequent annual increments of \$350, assuming they maintain an above satisfactory-to-excellent evaluation rating. Placement on the Career Schedule may occur at the fifth year. At that point the annual increment on the Basic Schedule is \$300; hence placement on career schedule carries twice the annual increment. Additionally, from the sixth year on the basic schedule has annual increments of \$250 compared to the \$350 annual increment for the Career Placement Schedule.

Placement on the Master Schedule carries an initial increment of \$800 and subsequent annual increment of \$450. Placement on the Master Schedule may occur at the sixth year, at which time the Basic Schedule has only a \$250 increment.

Thus, for example, three teachers each with an MA would receive the following salaries at the sixth and tenth year:

<u>Year</u>	<u>Basic</u>	<u>Career</u>	<u>Master</u>
6	8800	9200	9350
10	9800	10,600	11,150

The additional monies paid on the Career and Master Schedules are dependent on a continuing level of performance necessary to meet the requirements of the schedule. Teachers who fail to meet the eligibility requirements may receive only a partial or no increment, or may be returned to the Basic Schedule.

5. Conceptual Framework Discussion

This program, like the last one, has an individual target - the teacher. The program has goal, results, procedures, and measurements in both the input and process domains. The monetary reward is paid individually through a superordinate mechanism.

C. Output Domain

There have been many recent programs, experimental in nature, which involved the use of incentives to improve academic performance. Most of these programs had the student as the primary recipient.

Some experimental programs either focused on the teacher or included the teacher and sometimes the parent as a part of a more inclusive design.

During the school year 1971-72 the U. S. Office of Education designed and implemented a 1-year project on the use of incentives in education. In general, the experiment involved four school districts. In each district there were experimental and control schools. Two of the districts had incentives to teachers only programs and two of the districts had incentives to teachers and parents programs.

Planar Corp. (31) in its impact evaluation report generally concludes that the teacher only model did not demonstrate any differentially positive effects over the control school in improving student performance. On the other hand, the teacher/parent model did seem to have such effects. The report notes, however, that two features of the design impose severe limitations on the inferences which may be drawn from the study. (31, IV - 7 & 8) These design features are the lack of randomization in assignment of treatments to units and the small number of experimental units (i.e., only two per condition).

The description which follows is based on the Planar Corp. report (31) cited above and Blaschke's report. (1) The two models (teachers only and teacher/parent) were quite similar, hence described jointly.

1. Goal

The goal of this project was to demonstrate the feasibility of offering incentives to improve school learning. Two models of incentive were used: one, to teachers only; the other, jointly to teachers and parents.

2. Procedure

The procedure involved:

- (1) Four locations (medium-sized city districts), two for the teacher-only incentive model and two for the teacher-parent model
- (2) Within each district establishing experimental schools (those offering incentives) and control schools (roughly comparable to experimental schools) not offering incentives

- (3) Using standardized achievement tests to measure school (academic) learning
- (4) Establishing (for the academic improvement) a Basic Gain Indicator (BGI) - having an approximate Grade Equivalency (GE)
- (5) Administering standardized tests at the beginning and end of the experimental period
- (6) Paying an incentive bonus based on the test score gain
- (7) Using other measures (for example: questionnaires, interviews, school records and observation) to assess student, teacher, and parent behavior and/or attitudes. These types of measures, although used as partial indications to evaluate the project, had no bearing on the incentive payment.

3. Measurement

For the purposes of measurement relative to incentive payment only the Metropolitan Achievement Test Batteries were used. (27, p. 2-4) Students were given a test level suitable to their reading level as determined by their school records. A pre-test was given early in the school year (within the first month of school) and a post-test later in the school year (generally in the last 4-6 weeks). See Stake (32) for a discussion of the general inadequacies of such a testing plan.

4. Reward

The incentive to be paid depended on the average (mean) improvement of the class in terms of the basic gain indicator. The payments were made as follows:

<u>Improvement</u>	<u>Teachers</u>	<u>Parents</u>
Less than BGI	None	None
BGI	\$150	\$12.50
BGI + .1 GE	300	25.00
BGI + .2 GE	450	37.50
BGI + .3 GE	600	50.00

Teachers received the amount shown regardless of which model they took part in.

5. Conceptual Framework Discussion

This program had individual targets, one portion having teachers as targets, the other portion having teachers and parents as the targets. The goals, results, and measures were all in the output domain, the procedures apparently in the process domain since the program did not deal explicitly with the question of how the improvement in student performance was to occur. The monetary reward was paid individually on the basis of a measurement method determined by a superordinate mechanism.

In another sense the overall concept of the program was directed at modifying the input domain, in terms of examining the impact on teachers of a change in monetary reward.

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ABSTRACT

This report was written in response to requests from the Office of Long Range Planning (OLRP) of the New York State Education Department (SED). The work covers two different areas: the continuation of program analyses and the continuation of program designs addressing problems of educational accountability. As a result of SED resource allocation decisions, OLRP decided to concentrate on an investigation of the effectiveness of alternative methods for awarding categorical funds to school districts and the development of effectiveness measures for reading programs. Because these two tasks relate to different parts of OLRP's program and are different from each other, they are discussed separately. A work plan for each task is proposed in a separate section. (Author/JF)

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PROGRAM ANALYSIS AND DESIGN SUPPORT FOR THE OFFICE OF LONG RANGE PLANNING, NEW YORK STATE EDUCATION DEPARTMENT

Submitted to

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Preface

This proposal is being written in response to requests from the Office of Long Range Planning (OLRP) of the New York State Education Department (SED). The proposed work covers two different areas: the continuation of program analyses and the continuation of program designs addressing problems of educational accountability.

As a result of SED resource allocation decisions, OLRP has decided to concentrate on two work efforts: an investigation of the effectiveness of alternative methods for awarding categorical funds to school districts; and the development of effectiveness measures for reading programs. Because these two tasks relate to different parts of OLRP's program and are very different from each other, they are discussed separately in Sections I and II. In Section III, a work plan for each task is proposed. Section IV describes Riverside Research Institute (RRI), its capabilities, and its key personnel.

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I. A Program Analysis of Categorical Funding

A. Problem Statement

1. Situation

Categorical grant programs increasingly have become favored devices by which legislative bodies respond to demands that specific problems be addressed. Both the number of categorical funding programs and the dollar amounts involved are growing rapidly. The number of Federal categorical funding programs to State and local governments has increased from 23 in 1945 to an estimated 400 in 1966. The Federal dollar amount rose from \$3.3 billion in 1956 to \$20.2 billion in 1969, and is expected to rise to \$30 billion by 1975. The figure for 1969 represents almost 22% of domestic Federal expenditures. State governments also make heavy use of categorical funding programs through grants to localities--a total of \$23.8 billion in 1969.

The expansion of categorical funding programs has been nowhere more evident than in the education of the disadvantaged. Two nearly identical programs, one State, under the Urban Education Act, and one Federal, under Title I of the Elementary and Secondary Education Act, together funded 262.2 million dollars in 1971-72 for projects to benefit disadvantaged students in the local districts of New

York State. Still other programs have the same general goals and procedures.*

The fiscal consequences of these programs have been mixed at best. That the funds have been expended is clear, but whether these funds have been used as supplements to rather than substitutes for local revenues, or whether they have been concentrated on the target groups rather than being diffused to the general student population, are not at all clear.

Measurable results in terms of students' growth are even less encouraging. A recent study** by the American Institutes for Research in the Behavioral Sciences (AIR) is typical of numerous studies of the impact of categorically funded compensatory education programs. This analysis examined 1,200 evaluations from various sources where it had been reported that a project had produced cognitive benefits that were statistically and educationally significant. AIR evaluated these projects and their evaluation reports against the criteria that, to be labeled "successful," a project would have to produce achievement gains for disadvantaged children

* E.g., Headstart, Follow Through, Bilingual Education, Drop-out Prevention, Adult Basic Education, Upward Bound, Education of the Handicapped.

** Reported in Report on Education Research, Education News Service, October 17, 1971, pp. 6-8.

which were greater than those of their more advantaged counterparts. Further, this rate of gain would have to be maintained until the disadvantaged children actually caught up. The successful project also had to include a representative sample of not less than thirty children, and achievement gains had to be measured by some reliable testing instrument. After applying these criteria, only 326 of the original sample of 1200 survived. Analysis of the remaining projects showed 3.1 percent of these 326 were "successful" in terms of the criterion described above.

The AIR study provides a bleak picture of the projects. Similar analyses have arrived at similar conclusions.

The problem with these studies is that they provide few clues as to "why" a few projects succeed while most fail. That some succeed suggests that compensatory education is not impossible; that most fail suggests that something fundamental is wrong. What is wrong, and why it is wrong, are not addressed. As a consequence, these studies supply little insight into what can be done at any level to increase the effectiveness of categorically funded compensatory education. Moreover, these "evaluation" studies encourage simplistic (but politically popular) conclusions that the problems of the disadvantaged cannot be ameliorated through educational programs.

What is needed is a program analysis which systematically considers alternatives for achieving specific goals in compensatory education. This analysis should include alternative means of conducting categorical funding programs, alternative supplements to categorical funding, and alternatives to categorical funding itself. In New York State, the program analysis should concentrate on ESEA Title I and the Urban Education Act because, together, they account for many times the number of projects or the amount of funds involved in all other categorically funded compensatory education programs combined. For the New York State Education Department (SED), the program analysis should answer the following question: What should SED do to improve the effectiveness of Title I and Urban Education projects--and how should it be done? The proposed study is designed to answer this question, to lead to well-reasoned recommendations for future SED programs and to plans to implement the recommended programs.

2. Project Goal

To support the objectives of Title I and Urban Education, SED does not act directly on disadvantaged students. Instead SED works through local education agencies (LEAs) which plan, manage, and evaluate the funded projects. Other things being equal, the effectiveness of SED's programs depends on the quality of the LEAs' performance. Hence, SED's

programs are undertaken for both immediate and ultimate purposes. The immediate purpose is to improve the quality of project planning, management, and evaluation, functions currently performed by LEAs. The ultimate purpose is to benefit the educationally disadvantaged. While the ultimate purpose obviously takes priority, fulfillment of the immediate purpose is a necessary intermediate step. The proposed project reflects this formulation in adopting as the goal for the project to determine how SED can improve planning, management, and evaluation of projects funded under Title I and Urban Education. The achievement of this goal will constitute a first step toward improving the education of the disadvantaged, and will provide a framework for recommendations concerning categorical funding as a means for achieving specific educational goals.

B. Approach

1. Overview

The proposed project pursues the goal of determining how SED can improve project planning, management, and evaluation. The project will be performed in two phases:

Phase I - Program Analysis

Phase II - Program Design

Phase I will recommend what SED should do to improve planning, management and evaluation of projects funded under the Title I and Urban Education programs. Phase II will

recommend how SED should carry out the recommendations of Phase I. The two phases will be sequential, but the approach within each will be iterative and as empirical as possible given extant data.

2. Phase I--Program Analysis

Four tasks will comprise Phase I. Task 1 will consist of a description and evaluation of SED's present operations in carrying out the Urban Education and Title I programs. Descriptive data will be drawn from an examination of extant documents and from interviews with SED personnel. This information will be reduced to functional descriptions (flowcharts and prose) of the present operations of the two programs.

Two sorts of evaluation of present Title I and Urban Education programs will be conducted. First will be a process evaluation which will consist of a critique of the functional descriptions of the present SED programs against contemporary principles of planning, management, and evaluation. This evaluation may suggest near-term improvements in SED's processes.

The second evaluation will assess the extent to which SED's present Title I and Urban Education programs are effective in bringing about the immediate objective of encouraging high quality planning, management, and evaluation of LEA projects. Data for this evaluation will be drawn from

a systematic examination of a sample of the project allocations and evaluations submitted to SED by LEAs under the two programs. This second evaluation will provide a base-line for comparisons of alternatives in Tasks 2 and 3.

Task 2 will estimate the relative effectiveness of alternative incremental changes in SED's present programs, leading to a trade-off analysis among these options. The incremental changes that will be examined will consist of alternative combinations of critical design elements in the present programs, for example: the rigor of the requirements for project documentation (plans and evaluations) by LEAs, and whether funds are allocated by formula or by project competition; whether LEAs are expected to assume funding without SED support at some future date.

The first approximation to these estimates will be drawn from a comparison of the effects on LEA performance on several of SED's present programs which differ with respect to these critical design elements. Data for this comparison will be drawn from a systematic examination of a sample of LEA applications and evaluations much like the examination in Task 1, but including categorically funded, compensatory programs other than Title I and Urban Education.* For

* This will also provide, as by-products, data for summary evaluations of the selected programs. Should these evaluations reveal that any of the comparison programs have been

example, ESEA Title I and Urban Education differ principally in the rigor of documentation requirements; Bilingual Education is a project grant but Title I and Urban Education are formula grants; and so on.

The first approximation will be refined by constructing and using a crude description of the cause-effect relationships operative in project planning, management, and evaluation in LEAs. Correlations among LEA performance indicators and between LEA performance and such factors as district size, wealth, homogeneity, etc., will contribute to this description. Further refinement will be provided by a series of on-site observations and interviews in a small number of LEAs selected as "extreme cases" of high and low quality planning and evaluations as determined in the examination of LEA documents in the first approximation, described above. The field work will help identify important differences between LEAs having high and low quality performance. The resultant description, actually a very crude model will permit informed judgments as to why some projects fail while others succeed

particularly effective in eliciting the desired performance by LEAs, detailed analyses of these effective programs could be undertaken within the proposed work effort (if mutually agreed to by SED and RRI) or as a separately supported effort. Such additional analyses, which could include process evaluation, would be directed toward determining the reasons for the superior performance. The results of the additional analyses could be folded into the recommendations concerning Title I and Urban Education, as well as into recommendations concerning other categorical funding programs.

and what effects on LEA performance can be expected from incremental changes in SED's programs. Specifically, the description will guide the decisions as to whether the results of earlier comparisons can be extrapolated, or whether (and if so, how) they should be modified in making the predictions for a trade-off analysis among the incremental alternatives.

In Task 3, the search for alternatives will be broadened to include non-incremental alternatives and a second trade-off study will be conducted. A preliminary set of non-incremental alternatives is presented below. The development of the description of LEA performance will augment and refine this list. This preliminary set of alternative SED programs, however, excludes "strawman" design concepts as wasteful of resources both in empirical analyses and in subsequent trade-off analyses.

(a) Upgrading the quality of staff performance within the LEAs might be indicated if the above analyses identified a lack of LEA personnel capability as a major source of ineffectiveness. Three particular capabilities are distinguishable: project planning, project execution and project evaluation. Either of the two sub-alternatives below might address any of these functions or any combination of them.

(a.1) Training of LEA personnel might hold promise if it were found that, although LEAs do not presently have the needed capabilities, they contain people (e.g., the present "coordinators") or can attract people who can perform these functions well. In this case, SED might assist in the selection of LEA personnel and might conduct LEA personnel training programs at summer workshops, on the job, at branches of the State University, etc.

(a.2) Attaching SED personnel to LEAs might be indicated if LEAs appeared to lack (and to be unable to attract) persons who could conduct project planning, execution, or evaluation, but had staff members who seemed to be receptive to working with SED personnel skilled in these functions. SED personnel could work solely within one LEA, or could serve several. They could interpret their roles as agents of SED providing consultative support to LEAs, or they could interpret their roles as members of the LEA staff.

(b) Increasing the accountability of the LEA Boards and Superintendents might be a reasonable alternative if the data suggested that skilled LEA personnel either were or could be made available, but that other constraints were impeding their performance and that increased visibility would improve their effectiveness. The two sub-alternatives differ in that the first increases accountability to the Regents, while the second increases accountability to the community.

(b.1) Increasing accountability to the Board of Regents as the State authority responsible for the education of the citizens of New York State, might be accomplished by increasing the rigor of the review processes conducted by SED. Such a step might prove promising if the analyses in Task 2 suggested that projects funded under Urban Education were more effective than those funded under ESEA Title I. There are many ways of increasing the rigor of review processes and further design work would be required to formulate concrete recommendations. Changes in resource allocation procedures might or might not be involved (see alternative (c), below).

(b.2) Increasing accountability of LEAs to their communities might improve effectiveness if it appeared that Boards of Education, Superintendents, and LEA staff members were highly motivated by community sentiment. SED's activities under this sub-alternative might take the form of formal audits of LEA proposals and evaluations. These audits would appraise the validity of the data, analyses, and interpretations of results contained in LEA evaluations, and would include a written report to the LEA Board. This report would affirm that the LEA staff's procedures were valid, or, if they were not, would state why they were not, and provide appropriate, illustrative commentary. The Board and Superintendent would be required to make public the LEA's own

documents, SED's audit report, and, if they desire, their own comments, within a prescribed time period.

(c) Changing the basis for resource allocation in the LEAs might be appropriate if the earlier analyses indicated that LEAs lack the needed personnel capabilities; that the political constraints associated with pre-allocation of funds according to formulas constituted a major limitation on SED's ability to improve LEA performance; or that LEAs were using ESEA Title I and Urban Education funds to meet basic operating costs. This alternative leads to attempts to modify the resource allocation processes in the LEAs by changing the basis for granting funds to LEAs and thereby influencing the LEAs' allocation of these funds to projects.

(c.1) Constraining the LEAs to selecting among proven programs might be effective if many LEAs appear to be using Title I and Urban Ed funds for projects that are highly comparable with respect to the problems they address, the objectives they pursue, and the design concepts they employ. Under this sub-alternative, SED would develop and test "canned" projects for use in LEAs. LEA staff would select among proven projects, and the funds specifically allocated to the LEAs would be just sufficient to implement and operate the chosen projects. No funds would be available for projects other than those developed by SED. SED might

contract with or collaborate with publishers, LEA personnel, and others in developing and testing "canned" projects.

(c.2) Mixing block and project grants to LEAs might be effective if the LEAs' problems and programming needs were found to be diverse, and if LEAs presently have, or can attract and train personnel possessing programming capabilities. Under this sub-alternative, unconstrained or partially constrained block grants would be awarded to LEAs to bring each LEA budget up to the minimum needed to offset basic operating costs. In addition to these block grants, sizeable project grants would be awarded to those LEAs able to demonstrate competence in project planning, execution, and evaluation. The award of project grants could be made through rigorous review processes conducted by SED personnel or by special review panels convened by SED.

(d) Combinations of the foregoing alternatives and sub-alternatives supply a large number of additional options. A few examples follow:

(d.1) The increasing demands on LEA Boards and Superintendents generated by making them more accountable (alternative (b)) could be met in part by upgrading the quality of LEA staff performance within the LEAs (alternative (a)).

(d.2) Upgrading the skills of persons responsible for project execution in the LEAs (alternative (a)) could

be a critical element in making the SED-generated projects (sub-alternative (a.3)) effective at the LEA level.

(d.3) An important condition for implementing sub-alternative (d.2) might be to increase the responsibility of LEA Boards and Superintendents (alternative (b)). This combination would permit appraisal of the performance of LEA staff by comparative analysis, because the projects of proven effectiveness would come to the LEAs with records of results from previous field trials, and because comparisons across LEAs using the same projects during a given year could readily be generated.

Because the non-incremental alternatives lie farther from SED's present programs, greater uncertainty is present in estimates of their consequences. The description of LEA processes, developed in Task 2, however, will provide a preliminary basis for making the predictions needed for the trade-off analysis.

The results of the above three tasks of Phase I will be reviewed and consolidated in Task 4 into formal recommendations concerning the program SED should adopt as potentially the most effective in raising the quality of project planning, management, and evaluation of projects funded under Urban Education and Title I, subject to constraints of costs and feasibility.

3. Phase II--Program Design

Determining what should be done is only the first step. The next is to determine how to do it. Phase II will address the second question. A formal review by SED will be conducted between the two phases to insure the relevance of the design work in Phase II. The description of Phase II must be more tentative than the description of the first phase because Phase II depends on the results of the first phase for its substance.

Phase II will consist of five tasks. Task 1 will begin with the reduction of the most promising SED program alternative(s), as determined by the review of Phase I, to its (their) component activities and will conclude with the design of a system for executing and managing these activities.

Task 2 will consist of the development of a broad strategy for implementing the system designed in Task 1. It will focus on staffing, costs, time-phasing, likely contingencies, and how these contingencies may be dealt with.

Task 3 will consist of a sensitivity analysis, a challenging of the assumptions, conclusions, and concepts incorporated into the system design and the implementation strategy. This analysis will serve to identify major uncertainties and risks so they may be dealt with appropriately. These uncertainties will be divided into those which prohibit

implementation and those which can be coped with through modifications in the program design, the implementation strategy, or the iterative operation of the program after implementation.

Task 4 will be the generation of a program development plan which is more specific than the implementation strategy drafted in Task 2. It will contain detailed plans (tactics) for implementing those parts of the program about which there is low uncertainty and plans for reducing any uncertainties which might inhibit current implementation. Plans for reducing uncertainty might include field tests, further analysis, etc.

Task 5 will consist of the drafting of any policy position papers deemed necessary to support the Commissioner and the Regents in taking action based on the results of the study. Examples of cases where such papers might be useful include the relaxation of constraints (e.g., laws) which inhibit SED's effectiveness, and the adaptation of the results of Phase I to the more general fields of categorical funding programs and compensatory education.

4. Summary

The approach described above provides:

- (a) the analysis needed to determine what program SED should conduct to meet its immediate purpose of improving

the quality of planning, management, and evaluation of categorically funded projects to aid the disadvantaged;

(b) the program design necessary to manage and execute this program; and

(c) the plans and position papers needed to reduce any uncertainty regarding the program to tolerable levels and to implement the program design in an orderly and effective fashion.

II. Program Design Research: Effectiveness
Measures in Reading and for
School Operations

A. Background

OLRP, in the course of its work on the development of an accountability model for education in the State of New York, has analyzed norm-referenced, standardized test methodology to determine whether measures based on this approach are useful in constructing an accountability model. The results of OLRP's analysis are as follows.*

The demand for accountability has focused an increasing amount of attention on ways of measuring the outcomes of education. This concern can be reflected in the considerable amount of debate in the past several years over the types of instruments that should be used to measure educational outcomes. Much of the debate has centered on the efficacy of norm-referenced testing with respect to its use as a tool for educational programming and evaluation.

The primary conclusion that has been reached as a result of the analysis is that while these tests may serve useful purposes (if we make several stringent assumptions with such use), they cannot effectively contribute to any accountability system where the emphasis is placed on measuring student progress relative to educational treatment.

* Freeborne, G. Staff Paper on "Refining the Department's Policy on Racial Balance." Attachment B: Norm-referenced Testing. New York State Education Department, September 5, 1972.

This conclusion is based almost exclusively upon methodological considerations. Thus, what is being said is that even quality norm-referenced tests, because of the way they are constructed, cannot serve as the foundation of an accountability system nor as useful tools for educational evaluation. If two other considerations in addition to methodological considerations are included, namely the operational problems involved in constructing a quality norm-referenced test and the problems of interpretation of norm-referenced test results (particularly in the hands of persons not skilled in norm-referenced testing methodology), the evidence tends to indicate that these tests do much more harm than good.

To answer why these tests are not useful in any accountability framework, it is necessary to examine the major purposes of the tests, and given the purposes, examine how the tests are developed to achieve those purposes. The expressed intent of norm-referenced tests is to differentiate among students. The entire methodological framework is based upon developing an instrument which provides for a maximum amount of differentiation between individual scores. Thus, the guiding principle is one of relative comparison on individual to individual. Any individual scores from a norm-referenced test make sense only in relation to some other individual scores.

A second important principle is that you not only have differences in individual scores, but that you have wide variation in differences. Such wide variation is necessary if individual differences are to be statistically defensible, i.e., that the differences are not a result of luck, chance, etc. and that the differences are wide enough so that there is some level of confidence in making relative comparisons.

Given the concern for identifying individual differences and the need for wide variations in differences, a methodology has evolved over the past 50 years to achieve these ends. The methodology has established systematic and empirically validated ways of devising instruments to achieve differentiation and wide variability of individual scores. The emphasis has focused on constructing tests composed of a number of items of known characteristics. The most important characteristic of

an item, if differentiation is to be achieved, is that some percentage of individuals will respond to the item incorrectly. If all (or mostly all) individuals answer an item correctly (or incorrectly), that item becomes virtually useless in differentiating among individuals. Thus the driving force is toward generation of items that are neither "too easy" nor "too hard" in order to achieve a reliable degree of differentiation. (It has been proven statistically that the greatest degree of differentiation with wide variation is achieved if all or mostly all items on a test are of average difficulty, i.e., roughly half of the responses on each item are correct.)

The way a typical norm-referenced test is developed is that a number of items are generated from a specific content area, the items are pre-tested on a sample of students, and information on their responses is collected. Those items which differentiate best are most useful for achieving the purposes of the test. Thus, before a test item is included on the final version of the test, it is not necessarily known how the item differentiates, or why it differentiates, but what is known is that it does differentiate. The high correlation between achievement test results with intelligence or aptitude test results have led an increasing number of analysts to conclude that standardized achievement tests are not as adequate a measure of educational outcomes as they are of general mental abilities.

Norm-referenced testing instruments are poor choices for individual or program evaluation precisely because of the emphasis on differentiation and relative comparison of students. With an emphasis on differentiation, questions which all or most children can successfully answer are eliminated, or reduced to an absolute minimum. Thus, if knowledge bases of children expand (as could reasonably be expected over given time intervals), little or none of this would be perceived in an examination of norm-referenced testing results because the tendency is to eliminate common base information known by all children. The second, and even more critical aspect, is the masking of group growth because of the emphasis on relative comparison. A child is progressing "normally" if he

maintains the same relative rank on test results. Group progress (meaning improvement in scores) on the lower end of the test results only tends to raise average performance for all test results, and over time, moves the average higher. If the effects of this phenomena are combined with the effects of eliminating questions which are "too easy," it becomes fairly obvious that measurement of individual or group progress, particularly for evaluation purposes, is virtually meaningless.

A growth score is the difference between two individual scores either on the same test, equivalent forms of the same test, or comparable tests. Serious methodological problems exist in using any norm-referenced testing instrument for measuring growth or "progress," either on an individual or group basis. Testing experts have recognized the limitations in measuring growth with norm-referenced test methodology, and generally caution against the use of the tests for such purposes. The primary problem relates to an individual score and the error of measurement associated with that score. In computing individual growth scores, the error of measurement of the growth score is the sum of the errors of measurement of the two individual scores. Thus if growth scores are to be obtained which are statistically meaningful and not subject to a large error of measurement, it is necessary that such difference scores be quite large. However, when it is considered how the test is developed, it would be highly unusual to expect such large score differentials. What has been found in practice is that growth scores derived from norm-referenced tests are characterized by their extremely low reliabilities.

Significant methodological problems are also encountered in the development of norm-referenced tests with respect to introduction of cultural biases into the tests, and with respect to the adequacy of sampling the domain of knowledge to be tested. Cultural differences are normally associated with different language patterns and thought processes. To develop a standardized test which adequately takes into account such differences is impossible. What occurs is that the test is developed and normed primarily on the characteristics of the predominant culture. Any interpretations of test results of individuals who are not part of the predominant culture are suspect.

Adequacy of sampling the domain of knowledge to be tested involves content and behavioral considerations. It is not only important to test what a student knows (content) but also what he is able to do with what he knows (behavior). The adequacy of sampling from a content domain is not as much a methodological problem as it is an operational problem. Sampling of the behavioral domain, however, is a methodological problem for norm-referenced tests because many of the important educational outcomes desired are either not clearly specified or are not susceptible to measurement at this time. Thus, norm-referenced tests have no utility in assessing or evaluating the degree of creativity in individuals, interests, positive (or negative) attitudes, values, and appreciation of art, music, culture, etc., all of which are important educational goals. Lacking the capability of measuring these variables, norm-referenced testing instruments are forced to rely heavily on content considerations. This becomes problematic if emphasis on improvement of achievement scores comes at the expense of other important, non-measurable (at this time) goals.

It is apparent from the OLRP review that norm-referenced test methodology will not yield a good measure of what students have learned from a sequence of educational programs. Furthermore, the methodology, as indicated, has limited utility in measuring attitudes and other noncognitive outcomes.

The conclusion that norm-referenced tests are not useful in any accountability framework does not mean that an appropriate set of accountability measures, or even an appropriate set of objectives for such measures, can be specified at present. Objectives for accountability have not been

defined for two reasons. First, no view or model of accountability has ever been generally adopted. Second, the state-of-the art in education does not permit a demonstration that meeting one sequence of instrumental objectives in grades k through 12 will enable students to meet desirable terminal objectives better than another sequence of instrumental objectives. In fact, taking reading as an example, the present state-of-the art in education does not enable us to know what terminal objectives (e.g., the ability to read at a certain speed and with a specified level of comprehension) to set at all.

As a consequence of such gaps in the state-of-the art, OLRP has decided to undertake R&D efforts which will yield a preliminary set of alternative accountability measures. Although present cost constraints limit the number and extent of development of these preliminary measures, even a limited set will be useful to help to define precisely the standards which are to be met by educators.

In the following sections, three different accountability measures are proposed. In accord with OLRP aims, these measures are designed to address different aspects of accountability. The first, a reading effectiveness measure, is designed to focus on the outcome aspect of accountability, i.e., on measuring how well students can read in terms that

will have meaning to reasonably educated laymen. The second measure is designed to focus on an operational aspect of accountability by determining how well school districts carry out the necessary steps to create situations that enhance learning by students. The third measure focuses on another operational aspect: the extent to which school districts have established an environment which students positively value. The latter two measures, in effect, pose questions: should schools be accountable for communicating to students what is expected of them in order that they can profit from daily learning activities; and should schools be accountable for convincing students that schools provide a positively valued service to students?

The three proposed measures were selected after extensive discussions with OLRP staff. These discussions led not only to the selection of the three measures from a set which included other candidates, but also to a mix of research tasks making up an efficient R&D program for RRI. For example, as will become clear in a subsequent discussion, the work on the reading effectiveness measure required inventiveness. Tasks requiring inventiveness are more difficult to program than straightforward developmental efforts, and progress is rarely proportional to the number of people assigned to such tasks. Therefore, rather than massing

manpower on tasks requiring inventiveness in order to satisfy SED's wish to obtain one measure (e.g., reading effectiveness) before another, it was OLRP's judgment to select a set of measures and tasks to optimally harness RRI's R&D capability. Furthermore, OLRP decided that it was preferable to take three measures through to the design concept stage* during the proposed R&D program in order to provide OLRP with a basis for structuring SED decision-making processes, rather than to attempt to take one measure completely through all developmental stages.

The proposed measures also have secondary requirements which do not directly relate to educational accountability. These requirements will be discussed as the approach to the development of each proposed measure is reviewed. They have been included to improve the utility of the measures in meeting the immediate needs of managers in education.

B. Proposed Effectiveness Measures

1. Reading Effectiveness Measure(s)

(a) Background and functional requirements. Beginning with the Coleman report, a number of recent works have concluded that education (as characterized by input variables)

* The meaning of "design concept stage" for each measure will be made clear subsequently in this proposal.

is not strongly related to outcomes (e.g., reading achievement) if the effects of such variables as socioeconomic class and IQ are taken into account or controlled. Yet the authors of these works acknowledge that learning how to read and how to perform basic arithmetic operations are among the capabilities largely acquired from educational programs. Furthermore, they also acknowledge that mastery of some subjects such as arithmetic must take place predominately in the schools. Therefore it is important to understand why input-output studies have not shown that educational processes result in cognitive and noncognitive development.

Part of the problem may lie in the fact that input and output measures are frequently correlated with one another because they are constructed from a common, norm-referenced methodology. For example, both IQ and standard reading tests share a common test-construction methodology. Therefore, the scores of these tests may be highly correlated not because the phenomena these tests seek to measure are empirically related, but because both kinds of tests are actually (although unintentionally) measuring the same or nearly the same capabilities or capacities.

If the method correlation between measures of input and output variables is high, it follows that a limited amount of variance remains to be accounted for by other

variables, e.g., educational programs. For example, after IQ and reading achievement scores are correlated, there is a limited amount of variance left. If this limited amount of variance is too small to attribute to variables such as school programs, then it is no surprise that many studies have concluded that school programs do not strongly affect educational outcomes.

There may be other reasons why norm-referenced tests are inadequate measures of educational accountability. Let us assume that ten years of formal education raises the reading abilities of the members of a group by some measurable amount. Norm-referenced tests probably would never detect this change in ability. Because the tests are periodically renormed, the worst-performing student always defines the worst score. Therefore, the distribution of scores always looks the same, even though the worst student might be able to read a tax form after ten years of education while the worst student before ten years of education might barely be able to read traffic signs. Thus norm-referenced tests cannot reveal how much better or worse off people are today by comparison with any earlier time. And yet, it is well known that in the United States today, the level of literacy is substantially higher than it was in the 1920s.

The above discussion strongly suggests that the State needs new and different measures of effectiveness if it is going to account to the public for its activities. In the area of reading effectiveness, the new measure must satisfy the following functional requirements:

(a.1) It must determine how well individuals can read relative to the standards that define adult reading competence;

(a.2) It must be able to measure sufficiently fine distinctions in reading achievement to allow for the determination of student progress from grade 2 to grade 12. (This contrasts with available literacy measures which are too crude for monitoring the performance of students in the primary grades;)

(a.3) If possible, the measure should enable the SED to set minimum quantitative and qualitative objectives (standards) so that school systems can be held accountable;

(a.4) If possible, the measure should increase the validity of decisions affecting manpower resource allocation and the value of cost-benefit and other input-output studies, whether they are executed for policy-related or operational reasons.

(b) Alternative approaches for developing standards of reading competence.

(b.1) Expectations defining adult reading competence. In order to develop a reading effectiveness measure, the terminal reading capabilities expected must be defined. There are several approaches which could be used to formulate such standards:

- Specify a population of adult written materials and sample from this population a set which is then subjected to analysis and, ultimately, submitted to a panel of judges to define the required standards. The standards could be stated in the following form: "if certain specified conditions are met, an adult should be able to exhibit certain specified behaviors";

- Use any of a variety of methods (e.g., the Delphi Techniques*) to produce a consensus on the standards;

- Investigate theoretical models of language to see if they can be successfully used for the purposes of defining the standards.

* Weaver, T.W. Developing an accountable consensus of goals: The Delphi Technique. In Browder, L.H., Jr. (Ed.) Emerging problems of administrative accountability. Berkeley: McCutchen Corp., 1971.

The National Assessment Program appears to have elected the first alternative. The approach is expensive, somewhat arbitrary (experts with established points of view define the standards), the open-ended (language changes as society changes, and therefore it is necessary to re-examine standards periodically).

Problems are also associated with the second approach. Attempts to reach a consensus on any goal in education have produced useful results only when methods for lowering the level of abstraction in discourse have been introduced. Thus, for example, if the work required under the first alternative were accomplished, and if the people of New York State were given an opportunity to study the results, then something might be expected from using time-consuming and expensive consensus-producing processes.*

The last alternative has never (to RRI's knowledge) been tried. Sufficient information exists concerning at least some aspects of language to recommend that formal models be examined to determine if they provide

* Although RRI does not recommend holding consensus-validating sessions throughout the State of New York, the people in the end have the prerogative to set and validate standards. It would be desirable to use methods other than consensus-contriving techniques for this purpose.

enough information to enable the formulation of the required standards of measurement. This approach would anchor performance standards to hard data. In addition, the third alternative has other advantages. First, it is probably the least costly approach. Second, the approach may yield estimation methods to enable linguistic changes to be forecasted.* Third, and most important, the approach holds the promise of empirically testing assumptions concerning the importance of different sequences of expectations set for grades 2 through 12 to the achievement of adult competence

* All language has a history. The literature shows that some aspects of language change more rapidly than others. Some of these changes are clearly of limited interest in setting expectations. For example, words come and go in English (as in every other language) as a function of our major preoccupations. The word "flack" for example was introduced during World War II as an abbreviation of a German expression for an antiaircraft gun firing fragmentation shells. Many other archaic terms are with us still, and other words have long since passed out of common English use.

Some aspects of language change more slowly. It is precisely these aspects, however, which should be the subject of projections. More specifically, we need to determine whether materials written for the ordinary citizen have increased or decreased in "readability" over the last thirty years, and to measure the rate of increase or decrease in "readability." This work may lead to assessments of what the adult world will expect some fifteen years from now of a five-year old currently entering kindergarten. On the hypothesis that we work out methods for measuring the "readability" of written materials, then it should be possible to make such projections.

in reading.* This last application of measures of reading effectiveness is discussed further in the next section.

(b.2) Setting instrumental objectives. A measure of reading effectiveness must determine not only the extent to which an individual has achieved adult competence, but also the extent to which a student, at a given developmental stage, is progressing toward the expectations set by adults in the socialization process. Any of the alternative approaches outlined in (b.1) could be used to set the standards for each grade. However, the state-of-the art is such that no expert can be sure that, by acquiring capabilities X_1, X_2, \dots, X_n in Grade 2, capabilities Y_1, Y_2, \dots, Y_n in Grade 3, and so on, a student will eventually acquire adult competence in reading. The state-of-the art does not even permit the estimation of the probability of arriving at any level of reading competence if specified steps are followed.

Any consensus reached by adults using the Delphi or any other technique (even if it were efficiently arrived at for each grade) would simply be a

* This work is beyond the scope of the proposed R&D research but it is an important component of a larger effort leading to reading curriculum validation.

consensus which could be worthwhile or worthless depending upon how well adults from all walks of life intuitively understand human development. The third alternative, while it does not yield direct knowledge of the standards which should be set in grades 2 through 12, has the prospect of at least describing present expectations, and, in addition, of setting the stage for future research to show how the acquisition of reading skills can be simplified.

The discussion of alternative approaches, both with respect to setting expectations (standards) of adult competence as discussed in subsection (b.1), and with respect to setting instrumental objectives for each of the primary and secondary grades as discussed in subsection (b.2), suggests that the third approach--the use of formal models of language to develop the standards of reading competence at all levels--should be pursued.

c. Method of procedure. Discussions were held with OLRP concerning the trade-offs among alternative approaches to developing standards of adult competence in reading, and the problems associated with setting standards for each of the grades 2 through 12. OLRP accepted RRI's recommendation that an R&D instrumentation effort be undertaken to determine if formal models of language could provide a basis for developing both standards of reading

competence and new reading effectiveness measures.

On the basis of an incomplete literature search, it appears that an experimentally confirmed mathematical (lognormal) model of words (tokens) and word types has been formulated for the written, adult language. Furthermore, Carroll et al.^{*} have shown that the tokens and types contained in written materials used in grades 3 through 9 also can be described by lognormal distributions.

If the lognormal model adequately describes the distribution of tokens and types in written English, then a quantitative description of written materials in terms of their level (i.e., grades 3 through 12 and adult) is at hand. Furthermore, it should be possible to quantify the relationships among the written materials used in different grades and adult written materials. Finally, provided that samples of words are properly drawn, and provided that students know the meanings of these words, it should be possible to assess quantitatively the extent to which a student has progressed toward mastering adult vocabulary in each of the grades in which reading is taught.

The existence of such a model raises many possibilities for the identification of instrumental

^{*} Carroll, J.B., Davies, P. & Richman, B. Word frequency book. New York: Houghton Mifflin, 1971.

objectives for reading programs. With such a model, samples of written text used in various grades could be analyzed and significant differences identified. From these differences, the instrumental objectives which are currently governing instruction in each grade could be inferred. Suppose, for example, that analysis showed that, relative to adult English text, the most common words appeared more frequently in the lower than higher grades, that moderately common words appeared less often in the lower grades than in the middle or upper grades, and that the rarest words appeared only in the upper grades. From this information, a variety of instrumental objectives could be inferred: concentrate almost exclusively on teaching common words in the earliest grades; teach moderately common words in the middle grades and reduce the emphasis on reading the most common words; and introduce rare English words in the upper grades while sustaining, but at a reduced priority level, an interest in teaching the common and moderately common words.

Once the instrumental objectives have been identified, it should be possible to measure the extent to which students have met the expectations embodied in the materials used in the various grades. Furthermore, if samples of adult written materials (newspapers, tax forms, etc.) were related to the model describing the full adult

written language, then a rational basis for defining the capabilities for competent adult performance in reading should be feasible.

On the hypothesis that the R&D program is successful and RRI is able to properly sample word types for different purposes (to measure whether the expectations on students in each grade are being fulfilled and to measure student progress towards becoming a reader of adult-level text), it should be possible to devise test score reports that are understandable to parents as well as to other adults. For example, we might be able to report that student X has learned the meaning of nearly all of the most common English words, most of the next most common words, etc. and, in the aggregate, has acquired 2% of adult competence. Since Carroll^{*} has shown that adults can accurately estimate the relative frequency of English words, such scores should be intuitively meaningful to parents and others. This procedure would represent an advance over the present practice of reporting test results in technical jargon, e.g., national or regional grade norms, which many educators, no less laymen, don't understand.

* Carroll, J.B. Measurement properties of subjective magnitude estimates of word frequency. Princeton, N.J.: Educational Testing Service, 1971.

Formally describing the distribution of types and tokens in English may not describe English sufficiently well for our purposes. Undoubtedly educators would want to test to determine whether students comprehended passages of English text. Adults expect that children will improve their grasp of the meaning of written materials as they grow. More particularly, adults expect that learners will understand more complex explanations as the learners develop. Furthermore, as learners grow, they are expected to acquire the ability to infer the intent of a writer from his selective use of linguistic terms and forms, to be sensitive to alternative inferences which may be drawn, and to be aware of the variety of emotional effects which the writing might have on other readers.

There is no known way to completely describe all the meanings of written materials. However, all that is needed at present is the capability to scale the difficulty, or so-called "readability," of passages of text. Such scaling is feasible.

It should be feasible to characterize the "readability" of materials used at different grade levels as well as samples of adult materials. If a passage of English text were given a score on a "readability" scale, then it should be possible to draw samples of English text

of known "readability" for the purposes of testing comprehension. For example, if a student scores well on comprehension for the most "readable" text, less well for the next most "readable" text, and so on, then it should be possible to give the student an interpretable score. Furthermore, since one of the criteria used in the literature for scaling the "readability" of English text is type and token content, it may be feasible to translate scores on reading comprehension into mastery scores based upon the significance of knowing the meanings of different words with different probabilities of occurrence.

Syntax is another aspect of language which might have to be taken into account in formulating a reading effectiveness measure. It is well known that, as children grow, they are able to understand increasingly complex syntactical forms. At this time, however, there are many issues to be resolved concerning the best method for precisely describing the syntactical complexity of English text. Certainly a variety of linguistic characteristics (e.g., sentence length) could be measured. Whether any such indicators, or some combination of them, can adequately describe the increasingly complex set of expectations imposed on learners progressing from grades k through 12, is an open question. In addition, at this stage of

the research, much uncertainty surrounds the need to develop a separate scale of syntactical complexity or a separate test for mastery of syntax. A review of the literature might show that syntax is so hopelessly confounded with vocabulary and with "readability" that a separate test for mastery of syntax would be unnecessary to obtain valid reading effectiveness scores. Indeed, since the various aspects of language seem to be interrelated, it remains to be seen whether more than one aspect needs to be sampled for mastery in order to formulate an adequate effectiveness measure. On the other hand, people might be more inclined to accept test results if they felt that all aspects of language mastery were tested. Furthermore, having several independent ways of estimating progress towards becoming a competent adult has its advantages from a construct validity point of view.

2. Orientation Towards Learning: A Measure of the Effectiveness of School Operations

(a) Background. In colleges, formal courses and informal settings bringing together students and faculty are extensively used in an attempt to orient students to life in the institution and to the content and boundaries of various academic disciplines. In any educational environment, attempts are made to structure all learning situations by using some means of communication (usually speech and

written text) to explain what is expected of students, both with respect to their learning activities (calculating, reading, role-playing, etc.) and with respect to the aims, or expected outcomes of these activities. The capability for setting up successful learning situations depends on the ability of teachers to communicate instructions to students. Since this ability is an invariant expectation on teachers over the entire student age range and over all modes of instruction, OLRP and RRI have considered the development of a measure to determine the extent to which this expectation is being fulfilled, especially in the primary grades. OLRP has decided, as indicated previously, that it would be desirable to develop a prototype measure in order to be able to put the question in less abstract form to SED decision-makers. Therefore, RRI has agreed to propose the development of such a prototype measure.

(b) Method of procedure. One way of determining whether teachers are successful in setting up learning activities is to test whether students understand key instructions, for example, the concept "given." An understanding of such key concepts by students is a critical pre-condition for successfully setting up learning situations. Differentiating between one instruction, "read," and another instruction, "write," is also important to the success of

learning activities. Finally, insuring that all students share the meaning of key concepts and instructions is important for two reasons. First, instruction in school situations are most often given to a group of students, and second, there is a heavy reliance in educational institutions on students orienting each other so that group learning is facilitated.

A prototype measure may be formulated by sampling a set of key concepts related to the transmission of instructions to students in certain grades (say 2 through 12). If a synonym for each key concept in the sample were included in a set, then students could be asked to judge the degree of similarity between all pairs of concepts in the set. If a particular pair of words meant the same thing, the similarity judgment should be at its highest value. If the pair of words had little similarity, the similarity judgments should be minimal.*

Analyses of the judgments should permit a determination of the degree to which students comprehend important concepts (i.e., can identify the synonyms) and understand significant differences among concepts. In

* It is likely that the form of the test and the instructions will be based on the People Test (see "Guidelines for the evaluation of desegregation programs in school districts," RRI, September, 1972.

addition, it should be possible to derive a measure of the extent to which each student shares his similarity judgments with every other student. RRI believes that recent developments in multi-dimensional scaling techniques may be useful in developing the required measure.

(c) Other applications. The proposed measure has several other possible applications. First, it could be employed as a moderator variable in policy-related research. For example, if class size is reduced, some teachers may be better able to get students to understand and share instruction-related concepts than other teachers. This phenomenon might explain the weak relationships reported in the literature between class size and the cognitive outcomes of educational programs. Thus, the measure could be used (along with others) in investigations designed to determine optimal class size under different circumstances, e.g., different classroom mixes of racial and socioeconomic heterogeneity. Second, the measure might prove useful in research directed toward understanding why some teachers are more effective than others. (For example, good teachers may spend a good deal more time early in the semester getting students oriented towards what is expected of them.) Third, the measure could be useful in accounting for observed differential effectiveness among educational programs designed to meet the same objectives.

3. Valuing Learning and School: A Measure of the Effectiveness of School Operations

(a) Background. An invariant expectation on all educators is that they should structure an environment which is positively valued by students. The rationale for this expectation is based both on research findings and on observations made over the sweep of Western Civilization. Among the research findings are those which demonstrate a causal link between achievement and liking a teacher, or a field of study, or school in general. Among the axioms of educators are such statements as: "If rapport is not established between learners and teachers, little will happen of any value"; or "Learning induces anxiety since we have to venture and make mistakes. If a student believes that he will be negatively valued for making mistakes, he is apt not to volunteer to learn. Hence he will, to maintain self esteem, reject or ignore education." Therefore OLRP, as indicated previously, has requested that RRI develop a prototypical measure of student attitudes towards educational environments. Again, the rationale is to develop a measure which could be used by decision-makers as another measure of accountability.

(b) Method of procedure. RRI proposes to further develop its Test of the Special Meanings of Words,

which was designed and field-tested in previous work performed for SED. A description of this test follows.*

Test format and administration. Students (grades 5-12) are asked to rate each concept against a set of bipolar adjectives. One set of eleven adjective scales is used for rating human/animate concepts and another set of eleven for abstract/nonanimate concepts. Adjectives of obvious social desirability are excluded from the animate adjective group and descriptive or clearly denotative adjectives are excluded from the abstract/nonanimate group. The difficulty of the vocabulary is controlled so that all words in the test should be familiar to most upper third graders. Concepts and adjectives are either A or AA words in Thorndike-Lorge word book,* or appear on the Dale-Chall** or Stone *** easy word lists.

Since grade school children appear to work better and with greater sensitivity on a five-point scale,**** such a scale has been used in the Test of the Special Meanings of Words rather than the more frequently used seven-point scale. The center of the scale constitutes a neutral

* "Effectiveness of racial balance programs: Final report for Phase IIA, volume I," RRI, September, 1971.

* Thorndike, E. & Lorge, I. The teacher's word book of 30,000 words. New York: Teachers College Press, 1944.

** Dale, E. & Chall, J. A formula for predicting readability: Instructions. Educational Research Bulletin, 1948, 27(2), 11-28.

*** Stone, C. Measuring difficulty of primary reading material: A constructive criticism of Spache's measure. Elementary School Journal, 1956, 57, 36-41.

**** Osgood, C.E., Suci, G.J., & Tannenbaum, P.H. The measurement of meaning. Urbana: University of Illinois Press, 1957.

position, and the ends constitute the polar extremes of the adjective pair. All scale points are clearly labelled (anchored) as to meaning, following the suggestion of McNeil and Phillips.* Students are asked to decide which of the five scale points of the adjective pair comes closest to describing how the concept being rated "feels" to them, and to place a checkmark at that point along the adjective scale.

Factor analysis. Factor analytic studies of the Test of the Special Meanings of Words were carried out to determine whether factor structures were sufficiently comparable for black and white students at different levels of racial heterogeneity to permit valid comparisons between groups.

Scales by students matrices were obtained by summing over concepts. A separate matrix was obtained for black and for white students at each of four levels of racial heterogeneity. Each matrix was then intercorrelated to produce eight symmetric intercorrelation matrices. A principal components factor analysis was performed on each correlation matrix. The resulting factors were rotated to simple structure using a varimax rotation scheme. The factor structures were then compared. Since the first three factors accounted for over 80% of the common variance, the first three factors were used for comparisons between groups. Coefficients of congruence** were calculated to compare the factor structures of the eight groups. The coefficients were all exceedingly high, indicating that the groups used sufficiently similar frames of reference in rating the concepts to allow comparisons between blacks and whites and between students in classes of different racial compositions.

Validity studies. There are many studies in the research literature which document the

* McNeil, K.A. & Phillips, B.N. Scholastic nature of responses to the environment in selected subcultures. Journal of Educational Psychology, 1969, 60(2), 79-85.

** Wrigley, C. & Neuhaus, J.O. The matching of two sets of factors. American Psychologist, 1955, 10, 418-419.

predictive and construct validity of the semantic differential (SD) technique (e.g., Osgood et al.* and Reeves**). Moreover, it has been demonstrated that the evaluative dimension of the SD is an attitude measure, e.g., Likert, Thurstone, and Guttman attitude scales are highly correlated with the evaluative factor of the SD. Thus semantic differential data include attitude as a component of the "meaning" they index.

Since the validity of semantic differential techniques as attitude measures has been well documented, construct validation analyses for the Test of the Special Meanings of Words have been limited to demonstrating that the four subtests of the instrument measure the psychological constructs they were designed to assess. Thus validation analyses have been designed to show that indices derived from selected concepts differentiate between groups believed to differ with respect to sense of fate control, social class, self-concept and attitudes towards school. Preliminary studies comparing white and black students in the test-bed sample are reported in this section. These black-white comparisons make use of the statistic D, a generalized distance function which is an index of differences in connotative meaning between concepts.*** For each student who took the Test of the Special Meanings of Words, a D score was calculated for each of several key concept pairs. Analyses were then carried out to compare the D scores of white students with the D scores of black students.

* Osgood, C.E., Suci, G.J. & Tannenbaum, P.H. The measurement of meaning. Urbana: University of Illinois Press, 1957.

** Reeves, M.P. An application of the semantic differential to the Thematic Aperception Test material. Unpublished doctoral dissertation, University of Illinois, 1954.

*** Cronbach, L.J. & Gleser, G.C. Assessing similarity between profiles. Psychological Bulletin, 1953, 50, 456-473.

Osgood, C.E. & Suci, G.J. A measure of relation determined by both mean difference and profile information. Psychological Bulletin, 1952, 49, 251-262.

Osgood, C.E., Suci, G.J. & Tannenbaum, P.H. The measurement of meaning. Urbana: University of Illinois Press, 1957.

The Test of the Special Meanings of Words was originally developed to test hypotheses concerning some of the effects of school desegregation. (Other purposes are indicated in RRI's report. The instrument proved to be extremely sensitive, see pp. 50-51 of the report.)

Analyses of the Test of the Special Meanings of Words provides a basis for developing an efficient and more polished measure of attitude, in which the semantic differential technique will be used to measure the extent to which students share and positively value school-related concepts. Thus, it should fulfill the requirements of an accountability measure.

(c) Other applications. In RRI's report, "Effectiveness of racial balance programs: Final report for Phase IIA, volume I," several other applications of the instruments are described. In the work proposed here, one additional application will be attempted simply because the proposed accountability instrument can be constructed efficiently to meet an additional objective.

RRI proposes to develop a score (perhaps a score based upon the D statistic) to identify students who do not share their evaluations of components of school environments with others. RRI will develop the theory of such a measure for potential use in calling to the attention

of school administrators those students who negatively value school concepts. Such students might deviate sufficiently from others to be candidates for special courses of action. For example, the measure might identify candidates for a drop-out prevention program. Considering the number of drop-outs in urban areas (in New York City, 60% of the Spanish surnamed students eventually drop-out, and some 50% of the black students drop-out), it might be very worthwhile to detect potential drop-outs so that something could be done for them before rather than after they actually leave school.

III. Work Plan

This work plan consists of two parts. Part A contains tasks which follow from Section I of this proposal. Part B contains tasks which follow from Section II of this proposal.

A. A Program Analysis of Categorical Funding

1. The goal of this effort is to determine how SED can improve planning, management, and evaluation of projects funded under Title I and Urban Education. The objectives of the two phases which will fulfill this goal are as follows:

(a) Phase I: To conduct the program analyses necessary to recommend to SED the program which holds the greatest promise for improving planning, management, and evaluation of categorically funded projects to aid the disadvantaged.

(b) Phase II: To prepare the designs, plans, and position papers that will be necessary for the orderly and effective implementation by SED of the recommended programs.

2. Work Tasks

Riverside Research Institute (RRI) will apply its best efforts to carry out the Phase I and Phase II tasks enumerated below in conjunction with staff from the Office of Long Range Planning.

(a) Phase I: Program Analysis.

Task (A.1): A description and evaluation of SED's present operations under ESEA Title I and the New York State Urban Education Act.

Task (A.2): A trade-off analysis among incrementally different alternatives to SED's present Title I and Urban Education programs.

Task (A.3): A trade-off analysis among non-incrementally different alternatives to SED's present Title I and Urban Education programs.

Task (A.4): The consolidation and review of the findings of Tasks 1, 2 and 3, and the drafting of a recommendation to SED identifying the most promising program(s) for implementation.

(b) Phase II: Program Design.

Task (A.5): The determination of the component activities of the most promising program, and the design of a system for the execution and management of these activities.

Task (A.6): The development of a general strategy for implementing the program.

Task (A.7): A sensitivity analysis to identify critical uncertainties in the program design and implementation strategy developed above.

Task (A.8): The generation of a program development plan for reducing critical uncertainties and implementing the program.

Task (A.9): The drafting of any policy position papers deemed necessary to support the implementation of the recommended program. The drafting of position papers will be undertaken by mutual agreement between RRI and SED.

3. Management Plan

The work described in the proposed research will be monitored for SED by Mr. Gerald Freeborne, Assistant Commissioner for Long Range Planning. It will be directed for RRI by Dr. Ben Josephson, Jr., and will be managed by Mr. J. P. Brashear.

(a) Reports and schedule.

The proposed project will run from July 1, 1972 to June 30, 1973.

Bi-monthly progress letters will be transmitted to Mr. Freeborne. These will be supplemented by informal working papers from time to time, as mutually agreed upon by SED and RRI.

Formal written reports, supplemented by oral presentations if desired by SED, will be submitted at the completion of each of the two phases described in Section A.1. of this Work Plan. These reports will contain the results and recommendations of the work in each phase.

A review will be conducted under Mr. Freeborne's direction at the completion of Phase I in order to provide the guidance necessary to ensure the relevance of the design work in Phase II.

(b) Adjustments to the work plan.

Any modification in this Work Plan will be by mutual agreement of Mr. Freeborne for SED and Dr. Josephson for RRI.

B. Program Design Research: Effectiveness Measures in Reading and for School Operations

1. Project Goal and Objectives

The primary goal of this research is to develop the design concepts for one or more measures of reading effectiveness for the primary and secondary grades. The secondary goal of this research is to develop design concepts for two prototype measures of accountability that will establish how well school districts (and subordinate units) fulfill socially shared expectations.

2. Work Tasks

RRI will apply its best efforts to execute the following tasks.

- (a) The development of design concepts for a reading effectiveness measure (or measures).

Task (B.1): Fundamental Research

[i] Investigate and, if necessary, extend existing statistical models of the corpus of written English words and word types in order to permit an evaluation of the extent to which appropriate standards of reading capability (for the adult level and for different grade levels) can be established from the models, and a determination of how reading effectiveness measures based on these models might be constructed.

[ii] Investigate the validity of existing methods of describing the syntactical complexity of written English, evaluate the need to include syntactical elements in defining appropriate standards of reading capability (for the adult level and for different grade levels), and determine whether (and, if so, how) reading effectiveness measures based on syntactical models can be constructed.

[iii] Investigate and, if necessary, further develop methods for scaling the difficulty or "readability" of English prose in order to permit an evaluation of the utility of such methods in defining appropriate standards of reading comprehension (for the adult level and for different grade levels), and a determination of how effectiveness measures based on "readability" might be constructed to meet various objectives.

Task (B.2): Design Research

[i] Define detailed functional specifications for reading effectiveness measures. In particular, RRI will apply its best efforts;

- To determine how minimum standards of reading capability for each grade level and for the adult (terminal) level could be formulated;
- To determine how qualitative, incremental objectives for the development of progressively higher reading capability levels at different stages (grades) of the educational process could be constructed;
- To determine how progress towards adult reading capability can be defined operationally;
- To determine how the extent to which districts fulfill grade-level objectives and produce group gain in reading competence should be measured;
- To determine how the validity of decisions affecting manpower resource allocation, and the value of cost-benefit and other operational or policy related studies, can be increased through the use of reading effectiveness measures.

[ii] Define design criteria for reading effectiveness measures. In particular, RRI will consider:

- The nature of the scale required to meet the functional requirements in [i];

- The unit of measure;
- The required reliability level;
- The required face, construct and predictive validity.

[iii] Define design constraints for reading effectiveness measures. In particular, RRI will consider:

- Total time for test administration;
- Permissible unit cost;
- Required no-program bias.

Task (B.3): Test Methodology Development

Formulate design concepts for one or more tests of reading effectiveness which meet the conditions defined in Task (B.2). In particular, RRI will consider:

- How samples of words, syntactical forms, or passages of text should be drawn for purposes of test construction in order to satisfy the models investigated in Task (B.1);
- The development of appropriate test formats and prototype questions;
- The definition of scores;
- Test reliability.

Trade-off analyses will be performed to clarify problems in test construction. The analyses will trade off the functional requirements against the risks and uncertainties inherent in the models and in the methodology.

- (b) The development of design concepts for two measures of the effectiveness of school operations.

Task (B.4): Develop Design Concepts for a Measure of the Extent to Which Students Have Been Properly Orientated Towards Learning

In particular, RRI will consider:

- The functional requirements for the measure;
- The design concepts for the test instrument, including the definition and analyses of scores, test formats, prototype questions, etc.

Task (B.5): Develop Design Concepts for a Measure of the Extent to Which Students Value Learning and School

In particular, RRI will consider:

- The functional requirements for the measure;
- The design concepts for the test instrument, including the definition and analyses of scores, test formats, prototype, questions, etc.

3. Management Plan

The work proposed in this Section of the Work Plan will be monitored for SED by Mr. Gerald Freeborne, Assistant

Commissioner for Long Range Planning. It will be directed for RRI by Dr. Ben Josephson.

(a) Reports and schedule.

The proposed project will run from July 1, 1972 to June 30, 1973. Progress letters will be transmitted on an "as needed" basis to be determined by Mr. Freeborne.

A final written report, supplemented by oral presentations (if required by SED) will be submitted following the completion of all tasks in Section IIIB.

(b) Adjustments to the work plan.

Any modifications in this Work Plan will be by mutual agreement of Mr. Freeborne for SED and Dr. Josephson for RRI.

RIVERSIDE RESEARCH INSTITUTE*

SOCIAL SYSTEMS DIVISION

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Riverside Research Institute is a not-for-profit New York State membership corporation. RRI was formerly known as the Columbia University Electronics Research Laboratories which was formed on June 1, 1951.

The total RRI budget is currently \$10.0 million per year. Of the 340 employees, 150 are professional members of the research staff consisting of engineers, applied physicists, mathematicians, programmers, research psychologists, sociologists, economists, educators, and members of other scientific and engineering disciplines.

Riverside Research Institute currently consists of four major divisions, several special facilities and appropriate technical and administrative supporting services. Current research programs at RRI include the following:

Military Systems Studies

Theoretical and evaluative studies and technological support for satellite, ballistic missile, interceptor and aircraft systems; weapons, sensors, data processors, etc., and their strategic use.

Experimental Research in Physics, Biology and Engineering

Research programs are currently being operated in optics, electro-optics, acoustics and ultrasonics, electronics, plasma engineering, biomedical engineering, mathematics, mechanical design and computer sciences.

Radar Technology

This program includes the direction of the AMRAD Measurement Program, as well as the development and implementation of advanced technology for the AMRAD radar facility (White Sands Missile Range).

Social Systems and Urban Studies Divisions

Programs pertaining to research and evaluation in urban problems are handled by groups which include Research Psychologists, Social Psychologists, Mathematicians, Statisticians, Computer Specialists, Systems Analysts, Educational Specialists and personnel in other associated scientific disciplines.

Security

The Riverside Research Institute was granted a top Secret Facility Clearance on October 21, 1968 by the Defense Contracts Administration Services (Region, New York).

Facilities

Riverside Research Institute's main facility is located on Manhattan's upper west side. Engineering offices, research laboratories, a large digital computer and various support activities occupy over 80,000 square feet of space. Riverside Research Institute also directs the operation of the AMRAD Radar Facility located at the White Sands Missile Range in New Mexico.

The computing needs of the Institute are presently met by an on-site Sigma Seven computing facility and conveniently

located IBM 360 equipment situated off-site. These facilities are utilized for a wide variety of non-routine scientific problems, standardized data reduction procedures, and assorted business applications.

The Social Systems Division of RRI maintains a fully integrated and interlinked set of computer programs for statistical data reduction and data bank maintenance. Statistical procedures currently available include analysis of variance and covariance, all correlations and linear multiple regression analysis, t-tests for independent and correlated data, factor analyses and principle components analysis, analyses of uncertainty, chi-square analyses, and multiple discriminant analysis. This interlinked set of statistical packages is fully coordinated with data display programs to obtain, for example, frequency distributions, scatter plots, and multi-dimensional contingency tables. This program package also contains a variety of data checking and manipulation features such as merging and updating matrices, reports of bad and missing data, card sequencing checks, etc.

Support facilities at the Institute include modern well-equipped machine and electronics model shops, a drafting department, reproduction and photographic facilities as well as a library of reference work, current periodicals and technical reports. In addition, the vast library facilities of Columbia University have been made available to staff members of the Institute.

Research Experience in Societal Problems

Personnel in the Social Systems and Urban Studies Divisions have had primary responsibility for the implementation of RRI programs in urban affairs, education, social systems research and projects geared to the solution of urban problems. Specific on-going programs or those recently completed are summarized below:

Feasibility Study for a Blood Management System

RRI is presently conducting this study for the Community Blood Council of Greater New York under a grant from the National Institutes of Health. The CBC is a clearing house for blood and its derivative components, serving the greater metropolitan area.

Wastage of blood due to poor management policies in various hospital blood banks can account for up to a 30 per cent loss of fresh blood due to outdating. Because information exchange between various points in the system is inadequate, one hospital blood bank may be short of a particular type or component of blood which is in oversupply at another blood bank. The relationships between donor psychology, hospital usage and other components of the system are being identified so that peaks and valleys in the supply are evened out and a better distribution system developed. Since many blood diseases do not appear for as much as 180 days following a blood transfusion, a donor-recipient link should be established to

trace sources of infection. RRI, under subcontract to CBC, has undertaken a feasibility study to determine the extent to which a computerized system can solve some of these problems.

A Study of the Emergency Reporting System in
New York City

This is an effort to provide the Fire and Police Departments of New York City with information regarding the operation of a new Emergency Reporting System which will give the public a two-way voice communication link between a street location and the Fire or Police Departments. RRI will provide technological, statistical, social and psychological evaluations which will permit optimal use of the new system for both departments as well as the public. On the basis of collected information concerning telephone communications and other variables, RRI will suggest the functional specifications for the new system.

Evaluation of Science and Mathematics Curricula in
Two-Year Colleges

Under a grant by the Department of Health, Education and Welfare, the present science and mathematics curricula being offered at two-year colleges in New York State were evaluated. A final report was prepared for H.E.W. which delineated the results of the evaluation study and made recommendations for changing and unifying these programs.

Social Science Research in Educational Problems

With the support of an NIH grant the researchers at RRI have developed measures of the attitudes of children toward components of their school environment including peers, teachers, and various other aspects of school life. These measures are being employed to:

1. Determine the effect of school integration on the attitudes of Negro and white children toward one another and toward adults of different races.
2. Determine the relationships between attitudes toward components of the school environment and cognitive growth.
3. Evaluate the effects of special programs designed to change attitudes towards people and towards education.
4. Determine the long-range effects of social educational policies on attitude change and cognitive growth.

Evaluation of New York State Racial Impact Programs

The New York State Education Department is currently supporting a large number of programs to create racial balance and equal educational opportunity: rental of relocatable classes, school bussing, school construction, the usage of teacher aides, school-community coordinators, remedial assistance and the like. RRI is currently engaged in assessing and evaluating the multiple effects of the SED's racial imbalance project on children, teachers, and other components of school environments. On the basis of this evaluation, RRI will make recommendations for future funding.

In addition to the funding recommendations with regard to the racial imbalance correction and equal educational opportunity project, RRI plans to provide the State Education Department with the capability to proceed independently with future program evaluation. Relevant computer software packages may be delivered along with analytic between- and within-district statistical designs that have general application to SED's program evaluation requirements.

Consulting Relationship with the New York State
Education Department

RRI currently provides several types of consulting assistance to the New York State Education Department (SED). Current support provided to SED includes the following:

Consulting Efforts Designed to Coordinate Local and
State Efforts to Develop a Functioning Program Planning
and Evaluation (PPE) System for Occupational Education

Three PPE subsystems are under development: an evaluation-reporting subsystem, a targeting subsystem, and monitoring subsystem. The evaluation-reporting subsystem is designed to enable occupational education administrators to meet State and Federal reporting requirements and to provide the capability for assessment of program effectiveness. The monitoring subsystem provides the capability to monitor the progress of students in on-going occupational education

courses. The targeting subsystem enables the determination of the mix of occupational education programs which is "targeted" to local, regional, or statewide job market conditions.

Consulting Support to the Office of Long Range Planning

RRI provides general consulting support and technical assistance to the SED Office of Long Range Planning for the organization of State planning processes, as well as a variety of specific State planning efforts. These efforts include the coordination of State and district level program planning and budgeting, education evaluation and accountability.

Program Monitoring for School Districts

RRI has supported the development and maintenance of program monitoring systems in two school districts. Monitoring is concerned with assessing the extent to which students are meeting the curriculum objectives of programs in progress, and with the flexible allocation of educational resources to facilitate meeting the objectives.

MA-5 Training-Support Program for the Hard-Core Unemployed

The most serious problem confronting the hard-core unemployed is the absence of opportunities for gainful employment and training in tasks which require established education and skills. Experience has demonstrated that conventional training programs concerned exclusively with technical curricula

have only a very limited chance of success. Training in specific technologies poses many problems. They include overcoming the inadequate initial educational level of the trainees, and the personal difficulties that are bound to follow any intensive attempt at improvement.

Thus RRI's MA-5 program includes not only technical vocational training but also includes extensive initial orientation and counseling, job related basic education, special counseling and job coaching, supervisory and human relations training, as well as medical and dental services as required. These program elements are applied to each trainee on an individualized basis. Training is being currently offered for the following positions: computer peripheral equipment operator, electronics technician, mechanical draftsman and general machine operator. The program has a nine month duration.

Statistical Consulting and Evaluation

RRI provides data base maintenance, statistical consulting, statistical data reduction, and program evaluation services to school districts as well as to other not-for-profit organizations.

BERTRAM L. KOSLIN

Education

1950 The Johns Hopkins University
A.B. Biology
1963 University of Oklahoma
Ph.D. Psychology

Academic and Professional Experience

1970 - present RIVERSIDE RESEARCH INSTITUTE
New York City
Vice President for Research
and Director, Social Systems Division

1968 - 1970 RIVERSIDE RESEARCH INSTITUTE
New York City
Assistant to the Vice President
for Research
and Head, Social Sciences Research
Laboratory

1964 - 1968 PRINCETON UNIVERSITY
Princeton, New Jersey
Assistant Professor

1961 - 1964 BARD COLLEGE
Annandale-on-Hudson, New York
Assistant Professor

1960 - 1961 FAIRLEIGH DICKINSON UNIVERSITY
Rutherford, New Jersey
Instructor

1958 - 1959 UNIVERSITY OF OKLAHOMA EXTENSION
Norman, Oklahoma
Instructor

1958 - 1959 UNIVERSITY OF OKLAHOMA
Norman, Oklahoma
Research Associate, Institute of
Group Relations

1956 - 1958 UNIVERSITY OF OKLAHOMA
Norman, Oklahoma
Graduate Assistant

Bertram L. Koslin

Academic and Professional Experience (continued)

1955 - 1956	U.S. ARMY Education Advisor and Representative of the University of Maryland's ex- tension program for the southern district of France
1953 - 1955	UNITED FUND WELFARE ORGANIZATION (UNITED SEAMEN'S SERVICE) Representative in Japan, France and Italy
1950 - 1952	THE JOHNS HOPKINS UNIVERSITY Baltimore, Maryland Research Associate

Major Consulting and Professional Positions

1968 - present	Canada Council, Social Sciences and Humanities Division
1968 - present	Riverside Research Institute, New York City
1967 - present	Woodrow Wilson Foundation, Princeton, New Jersey
1966 - 1967; 1969	Panel Member: National Science Foundation
1967 - 1968	Two Ford Foundation projects through Institute of Educational Development.
1967 - 1968	Educational Testing Service, Prince- ton, New Jersey
1967	The Board of Regents of the State of New York, through Institute of Edu- cational Development. (Member of a five man study panel for the N.Y.S. Commissioner of Education on the pro- blems of decentralizing the New York City Educational System.)

Bertram L. Koslin

Major Consulting and Professional Positions (continued)

1964 - 1968	Associate Editor: Public Opinion Quarterly
1964 - 1968	Director: National Science Foundation Research Program in Psychology at Princeton University.

Selected Activities with Professional Societies and Organizations Since 1967

Sept., 1971	Koslin, S., Koslin, B., Pargament, R. & Bird, H. Children's social distance constructs: A developmental study. Paper accepted for presentation to the meetings of the American Psychological Association, Washington, D.C.
Feb., 1971	Koslin, S., Koslin, B. & Pargament, R. Relationships between educational integration policies and students' racial attitudes. Paper presented to the meetings of the American Educational Research Association, New York City.
March, 1970	Koslin, S., Koslin, B., Pargament, R. & Waxman, H. Classroom racial balance and students' interracial attitudes. Paper presented at the meetings of the American Educational Research Association, Minneapolis.
Sept., 1969	Koslin, S., Koslin, B., Cardwell, J. & Pargament, R. A quasi-disguised and structured measure of school-children's racial preferences. Paper presented at the meetings of the American Psychological Association, Washington, D.C.

Bertram L. Koslin

Selected Activities with Professional Societies and Organizations Since 1967 (continued)

- April, 1969 Koslin, B., Cardwell, J. & Pargament, R. Which Negroes prefer what skin-color? Paper presented to the meetings of the Eastern Psychological Association, Philadelphia.
- Sept., 1967 Koslin, B. Muzafer Sherif's contributions to social psychology. Invited address: selected to present Kurt Lewin Memorial Award, Society for the Psychological Study of Social Issues, American Psychological Association.
- April, 1967 Koslin, B. & Pargament, R. Are assimilation-contrast displacement effects a function of perceptual distortions? Paper presented to the meetings of the Eastern Psychological Association.
- April, 1967 Koslin, B. Field research and conceptual systems theory. Discussant's paper, Symposium on Conceptual Theory Research, Eastern Psychological Association.

Invited Colloquia Since 1967

- 1971 Graduate Division, University of the City of New York.
- 1970 Columbia University, New York City.
- 1968 Purdue University.
- 1968 The University of the City of New York: Brooklyn College.
- 1967 The University of the State of New York at Albany.

Bertram L. Koslin

Invited Colloquia Since 1967 (continued)

1967	Rutgers, The State University of New Jersey.
1967	Columbia University.
1967	The University of the City of New York.
1957	Rutgers, The State University of New Jersey.

Past and Current Research Grants

Total: 5 (NIH and Peace Corps)

Current: A Study of Race and Attitudes Toward School.
Co-Principal Investigators S. Koslin and B. Koslin. Period covered: 1966 - present.

Selected Publications Since 1967

1. Koslin, B.L., Suedfeld, P. & Pargament, R. Belief instability as a moderator variable in opinion change. The British Journal of Social and Clinical Psychology. (In press.)
2. Koslin, S., Koslin, B.L., Pargament, R. & Waxman, H. Classroom racial balance and students' interracial attitudes. Sociology of Education. (In press.)
3. Koslin, B., Pargament, R. & Suedfeld, P. An uncertainty model of attitude change. In P. Suedfeld (Ed.) Alter-natives in Attitude Theory. New York: Atherton. In press.
4. Koslin, B.L., & Pargament, R. Effects of attitude on the discrimination of opinion statements. Journal of Experimental Social Psychology, 1969, 5, 254-264.
5. Koslin, B.L. Muzafer Sherif's contributions to social psychology. Journal of Soc. Issues, 1968, 24, 36-37.

Bertram L. Koslin

Selected Publications Since 1967 (continued)

6. Koslin, B.L., Haarlow, R.N., Karlins, M. & Pargament, R. Predicting group structure from member's cognitions. Sociometry, 1968, 31, 64-75.
7. Koslin, B.L. Laboratory experiments and attitude theory. In C. Sherif & M. Sherif (Eds.) Attitude, ego-involvement and change. New York: Wiley, 1967, pp. 76-87.
8. Sherif, M. & Koslin, B.L. Some comments on the institutional-behavioral controversy with special reference to political science. In M. Sherif (Ed.) Social interaction: Processes and products. Chicago: Aldine, 1967, pp. 98-116.
9. Koslin, B.L., Stoops, J. & Loh, W. Source characteristics and communication discrepancy as determinants of attitude change and conformity. J. Exp. Soc. Psychol., 1967, 3, 230-242. "
10. Koslin, B.L., Pargament, R. & Levine, S. Effects of learning on judgment in the presence of discrepant anchors. Psychonomic Science, 1967, 9, 565-566.

Ben Josephson, Jr.

EDUCATION

1959 Fulbright Scholar
University of Nottingham,
England

1958 Massachusetts Institute
of Technology
Ph.D. Physics

1953 Cornell University
Bachelors of Engineer-
ing Physics

PROFESSIONAL EXPERIENCE

1970 - RIVERSIDE RESEARCH INSTITUTE
New York City
Acting Director, Social
Systems Division

1970 RIVERSIDE RESEARCH INSTITUTE
New York City
Director, Urban Systems Division

1969 - 1970 RIVERSIDE RESEARCH INSTITUTE
New York City
Assistant to the Vice President
for Institute Development

1968 - 1969 RIVERSIDE RESEARCH INSTITUTE
New York City
Member of the Research Staff

1969 - 1970 THE TREADWELL CORPORATION
Consultant

1968 - 1969 NEW YORK UNIVERSITY
Adjunct Associate Professor
of Physics

1967 - 1968 NEW YORK UNIVERSITY
Associate Professor of Physics

1963 - 1967 NEW YORK UNIVERSITY
Assistant Professor of Physics

1960 - 1963 RICE UNIVERSITY
Houston, Texas
Assistant Professor of Physics

Ben Josephson, Jr.

PROFESSIONAL EXPERIENCE (continued)

1959 - 1960

RICE UNIVERSITY
Houston, Texas
Research Associate, Low
Temperature Group

PROFESSIONAL AND HONORARY SOCIETIES

Tau Beta Pi
Society of the Sigma Xi
American Physical Society
The Institute of Physics and the Physical Society (England)
The Institute of Electrical and Electronic Engineers
The New York Academy of Sciences
The American Association for the Advancement of Science
Listed in American Men of Science

PUBLICATIONS

Open Literature:

The coupling of a spin system to a cavity mode. Proc. Phys. Soc., 1959, 74, 561. (with K.W.H. Stevens)

The effect of color centers on the nuclear spin-lattice relaxation time of F nuclei in LiF. J. Phys. Chem. Solids, 1962, 23, 67. (with M.W.P. Strandberg)

Microwave ultrasonic attenuation in ruby. Bull. Am. Phys. Soc., 1962, 1, 15. (with R.N. Claytor and P.L. Donoho)

Nuclear spin-lattice relaxation time in CaF_2 doped with rare earth elements. Bull. Am. Phys. Soc., 1963, 8, 346. (with M.A. Waldrup)

Phonon-phonon interaction in CaF_2 . Bull. Am. Phys. Soc., 1964, 9, 533. (with B.R. Breed and P.L. Donoho)

Spin-lattice relaxation of F^{19} in CaF_2 in low temperature. Phys. Rev., 1965, 137, A108. (with S.M. Day and E. Otsuka)

Ben Josephson, Jr.

PUBLICATIONS (continued)

Numerous RRI reports and proposals, for example:

Study of the Emergency Reporting System for New York City.

Cable Television in the Public Interest: New Directions
for New York State.

A Targeting System for Occupational Education.

Samuel A. Scharff

EDUCATION

- 1943 Massachusetts Institute of Technology
B.S.E.E.
- 1964 Stevens Institute of Technology
MS
Interdepartmental program of courses relevant to design and use of digital computers.
- Massachusetts Institute of Technology
SBEE, and two terms of Graduate School courses.
Program centered on feedback control systems.

SUMMARY WORK EXPERIENCES

1970 - present

RIVERSIDE RESEARCH INSTITUTE
New York City
Assistant to the Vice President of Research.

August, 1968 - 1970

RIVERSIDE RESEARCH INSTITUTE
New York City
Systems Engineer. Programs analyst, programming, planning and budgeting. Management monitor of research

January, 1953 -
August, 1968

"Data/Control Systems": computers, automatic controls, communications, displays, and control panels -- integrated systems for men with a job to do.

Requirements studies; feasibility studies; designs, including cost/effectiveness comparisons; construction; test; maintenance.

Also, components for Data/Control Systems: mechanical, optical, electrical, and electronic devices -- design, construction, test, maintenance.

Samuel A. Scharff

SUMMARY WORK EXPERIENCES (continued)

Clients:

President's Task Force on Communications Policy
United States Air Force - Office of the Assistant Secretary, R & D; Rome Air Development Center, A. F. Systems Command
The RAND Corporation
General Electric Company
The Louis Allis Company
Automation Dynamics Corporation
Capehard Corporation
Dennison Manufacturing Co.
Jamaica Water Supply Co.
Royal McBee Corporation
University Controls Corporation
James P. O'Donnell, Consulting Engineer

STEVENS INSTITUTE OF TECHNOLOGY
Visiting Lecturer

PREVIOUS WORK EXPERIENCE

1941 - 1953

M. W. Kellogg Company.
Project Engineer, Military Service, U.S. Air Force: Rome Air Development Center; Far East Air Forces.
General Electric Co., 12 months of full-time work while in M.I.T. cooperative course plan in Electrical Engineering.

PROFESSIONAL AFFILIATIONS

Institute of Electrical and Electronics Engineers
Association for Computing Machinery
Society for General Systems Research
New York State and National Societies of Professional Engineers

LICENSED PROFESSIONAL ENGINEER: State of New York and State of New Jersey.

Richard Pargament

EDUCATION

1965 Bard College
A.B.

1967 Princeton University
M.A. Psychology

1968 Princeton University
Ph.D. Psychology

ACADEMIC AND PROFESSIONAL EXPERIENCE

1969 - Present

RIVERSIDE RESEARCH INSTITUTE
New York City
Manager, Social Systems Division

1968 - 1969

RUTGERS - THE STATE UNIVERSITY
Assistant Professor, Department
of Psychology

RIVERSIDE RESEARCH INSTITUTE
New York City
Consultant

1965 - 1968

PRINCETON UNIVERSITY
Teaching Fellow: Statistics,
Personality, Social Psychology

Research Assistant, Communication
and Social Interaction Laboratory

RUTGERS - THE STATE UNIVERSITY
Coadjutant Lecturer, Department
of Psychology

INSTITUTE OF EDUCATIONAL DEVELOPMENT
Psychometric Consultant

PROFESSIONAL MEMBERSHIPS

American Educational Research Association
American Psychological Association

Richard Pargament

PUBLICATIONS

- Belief instability as a moderator variable in opinion change. The British Journal of Social and Clinical Psychology, in press. (with B.L. Koslin and P. Suedfeld)
- An experimental attack on smoking. International Journal of the Addictions, in press. (with P. Suedfeld, P.B. Landon, and Y.M. Epstein)
- Classroom racial balance and students' interracial attitudes. Sociology of Education, in press. (with S. Koslin, B.L. Koslin and H. Waxman)
- An uncertainty model of attitude change. In P. Suedfeld (Ed.) Alternatives in Attitude Theory. New York: Atherton, 1972. (with B.L. Koslin and P. Suedfeld)
- The role of experimenter and subject expectations in sensory deprivation. Representative Research in Social Psychology, 1971, 2 no. 1. (with P. Suedfeld, P.B. Landon and Y.M. Epstein)
- Effects of attitude on the discrimination of opinion statements. Journal of Experimental Social Psychology, 1969, 5, 245-264. (with B.L. Koslin)
- Predicting group structure from member's cognitions. Sociometry, 1968, 31, 64-75. (with B.L. Koslin, R.N. Haarlow and M. Karlins)
- Effects of learning on judgment in the presence of discrepant anchors. Psychonomic Science, 1967, 9, 565-566. (with B.L. Koslin and S. Levine)

RECENTLY PRESENTED PAPERS

- Efficacy of school integration policies in reducing racial polarization. American Psychological Association symposium paper, to be presented September, 1972. (with S. Koslin and B.L. Koslin)
- Children's social distance constructs: a developmental study. American Psychological Association paper, Washington, Sept., 1971. (with S. Koslin, B.L. Koslin and H. Bird)

Richard Pargament

RECENTLY PRESENTED PAPERS (continued)

Relationships between educational integration policies and students' racial attitudes. American Educational Research Association paper, New York City, February, 1971. (with S. Koslin and B.L. Koslin)

Classroom racial balance and students' interracial attitudes. American Educational Research Association paper, Minneapolis, Minn., 1970. (with S. Koslin, B. Koslin and H. Waxman)

Which Negroes prefer what skin color? Eastern Psychological Association paper, Philadelphia, 1969. (with B.L. Koslin and J. Cardwell)

A quasi-disguised and structured measure of school-children's racial preferences. American Psychological Association paper, Washington, 1969. (with B.L. Koslin, S.C. Koslin and J. Cardwell)

Are assimilation contrast displacement effects a function of perceptual distortions? Eastern Psychological Association paper, April, 1967. (with B.L. Koslin)

Henry B. Bird

EDUCATION

1963 Bard College
A.B.
1967 University of Oklahoma
M.A. Sociology
1968 University of Oklahoma
Ph.D. Social Psychology

PROFESSIONAL EXPERIENCE

1972 - Present

RIVERSIDE RESEARCH INSTITUTE
New York City
Assistant Manager, Social
Systems Division

1970 - 1972

RIVERSIDE RESEARCH INSTITUTE
New York City
Member of the Research Staff

1968 - 1969

CENTER FOR COMMUNITY RESEARCH
New York City
Director, Computer Applications
Department

1965 - 1968

THE UNIVERSITY OF OKLAHOMA
MEDICAL CENTER
Norman, Oklahoma
Research Assistant for
Dr. John Bruhn

1963 - 1965

INSTITUTE OF GROUP RELATIONS
University of Oklahoma
Research Fellow for
Dr. Muzafer Sherif

AREAS OF EXPERIENCE

Research design and evaluation of projects in social welfare, medical sociology, learning processes, small group behavior, attitudes and attitude change, and public education.

Interviewing and participant observation experience.

Henry B. Bird

AREAS OF EXPERIENCE (cont'd)

Experience in Fortran, PL1, Cobol, OS, DOS, 360-series computers, data base management, and optical scanning technology.

PUBLICATIONS

Social aspects of coronary heart disease in a Pennsylvania German community, Social Science and Medicine, 1968, 2, 201-212. (with J. Bruhn and B. Chandler).

Some selected factors relating to adolescent group functioning, published Doctoral dissertation, Univ. of Oklahoma, August, 1968.

Social profiles and academic standing: A study of first year medical students. The Oklahoma State Medical Journal, October, 1967. (with Bruhn and Adsett)

A study of the class distribution of small solid adolescent groups, unpublished Master's thesis, University of Oklahoma, 1966.

A preliminary study of inter-clique relations, Bard Psychology Journal, 102, August, 1963.

PRESENTED PAPERS

Children's social distance constructs: A developmental study. American Psychological Association paper, Washington, Sept., 1971. (with S. Koslin, B.L. Koslin and R. Pargament)

PROFESSIONAL MEMBERSHIP

American Sociological Association

Sandra Cohen Koslin

EDUCATION

1959 Queens College, City
University of New York
A.B. Elementary Educ.
1961 Teachers College,
Columbia University
A.M. Educational Psych.
1964 Teachers College
Columbia University
Ph.D. Educational Psych.

ACADEMIC AND PROFESSIONAL EXPERIENCE

1968 - Present	<u>RIVERSIDE RESEARCH INSTITUTE</u> New York City Member of the Research Staff
1968 - 1969	<u>INSTITUTE FOR COMMUNITY STUDIES</u> Sarah Lawrence College Bronxville, New York Research Psychologist and Teaching Associate
1964 - 1968	<u>EDUCATIONAL TESTING SERVICE</u> Princeton, New Jersey Research Psychologist
1963 - 1964	<u>LEXINGTON SCHOOL FOR THE DEAF</u> New York City Research Assistant
1961 - 1963	<u>TEACHERS COLLEGE, COLUMBIA UNIVERSITY</u> New York City Research Assistant
1959 - 1960	<u>NEW YORK CITY PUBLIC SCHOOLS</u> East Harlem in New York City 4th grade Teacher

Sandra Cohen Koslin

HONORS

New York Regents Scholar
Phi Beta Kappa
Summa Cum Laude
National Defense Fellow
Psi Chi
Sigma Xi

RECENT PUBLICATIONS

1. Koslin, S., Koslin, B.L., Pargament, R. & Waxman, H. Classroom racial balance and students' interracial attitudes. Sociology of Education, in press, 1972.
2. Koslin, S.C., Amarel, M. & Ames, N. The effect of race on peer evaluation and preference in primary grade children: An exploratory study. Journal of Negro Education, 1970, 39, 346-350.
3. Koslin, S.C., Amarel, M. & Ames, N. A method for assessing primary grade children's expectations of school. ETS Research Bulletin 70-25. Princeton: Educational Testing Service, 1970.
4. Koslin, S.C. Equal educational opportunity. Education and Urban Society, 1969, 2, 119-121.
5. Koslin, S.C., Amarel, M. & Ames, N. A distance measure of racial attitudes in primary grade children: An exploratory study. Psychology in the Schools, 1969, 6, 382-385.
6. Cohen, S.R. An exploratory study of young children's attitudes toward school. Proceedings, 75th Annual APA Convention, 1967.
7. Cohen, S.R. Exploratory study of young children's perceptions of teacher behavior. Proceedings, 75th Annual APA Convention, 1967.
8. Cohen, S.R. Predictability of deaf and hearing story paraphrases. Journal of Verbal Learning and Verbal Behavior, 1967, 6, 916-921.
9. Cohen, S.R. An exploratory study of student attitudes in the primary grades. ETS Research Bulletin 65-30. Princeton: Educational Testing Service, 1965.
10. Cohen, S.R. Redundancy in the written language of the deaf: Predictability of story paraphrases written by deaf and hearing children. In Rosenstein, J. and MacGinitie, W. (Eds.) Research studies on the psycholinguistic behavior of deaf children. Washington: The Council for Exceptional Children, NEA, 1965.

Sandra Cohen Koslin

RECENT PAPERS PRESENTED AT LEARNED SOCIETIES

- 1, 2. Koslin, S., Koslin, B.L. & Pargament, R. Efficacy of school integration policies in reducing racial polarization. American Psychological Association, Washington, D.C., September, 1971 and 1972.
3. Koslin, S., Koslin, B.L., Pargament, R. & Bird, H. Children's social distance constructs: A developmental study. American Psychological Association, Washington, D.C., September, 1971.
4. Koslin, S., Koslin, B.L. & Pargament, R. Relationships between educational integration policies and students' racial attitudes. American Educational Research Association, New York City, February, 1971.
5. Koslin, S., Koslin, B.L., Pargament, R. & Waxman, H. Classroom racial balance and students' interracial attitudes. American Educational Research Association, Minneapolis, March, 1970.
6. Koslin, S., Koslin, B.L., Cardwell, J. & Pargament, R. A quasi-disguised and structured measure of schoolchildren's racial preferences. American Psychological Association, Washington, D.C., September, 1969.
7. Koslin, S.C. The measurement of schoolchildren's racial attitudes: A validity study. Eastern Psychological Association, Philadelphia, April, 1969.
8. Koslin, S., Amarel, M. & Ames, N. A distance measure of social perceptions in white and Negro primary grade children. American Psychological Association, San Francisco, September 1968.
9. Koslin, S., Amarel, M. & Ames, N. The effect of race on peer evaluation and preference in primary grade children: An exploratory study. American Educational Research Association, Chicago, February, 1968.

Jerry P. Brashear

EDUCATION

1967 Princeton University
Princeton, New Jersey
B.A. Psychology

1969 Harvard Business School
Boston, Massachusetts
M.B.A.

Present University of Michigan
Ann Arbor, Michigan
Ph.D. Candidate - Urban and
Regional Planning

ACADEMIC AND PROFESSIONAL EXPERIENCE

1971 - present RIVERSIDE RESEARCH INSTITUTE
New York City, New York
Member of the Research Staff

1969 - 1971 COMMUNITY SYSTEMS FOUNDATION (CSF)
Ann Arbor, Michigan
Consultant

summer 1969 MC KINSEY AND COMPANY, INC.
New York City, New York
Research Associate

summer 1968 MAYOR'S OFFICE, CITY OF NEW YORK
New York City, New York
Mayor's Intern

AREAS OF EXPERIENCE

Program planning of the Community Renewal Program for the City of Ann Arbor. Worked on defining problems in physical planning, capital budgeting, and PPBS; designing research and analytic steps; design and implementation of project management/control system.

Analysis of program plans for Harambee, Inc., a black community development agency: cashflow planning, organizational structure, implementation tactics.

Planning, management, and analytic consultation on various departmental problems within selected local government agencies.

Analysis of New York City government organizational structure: Mayor's Office and staff-line relations, community control questions addressed.

Jerry P. Brashear

AREAS OF EXPERIENCE (cont.)

Analysis of the budgetary and control processes of the Boston Police Department; budget preparation and justification; cost accounting, management planning and control; analytic capabilities.

Summary investigation of the present and projected involvement of the private sector in public education; street academies and training programs; computer-aided instruction; curriculum development, etc.

Experimental research into the affects on attitude change of source prestige, discrepancy, and reference scale stability, singly and in interactions.

CORNELIUS LANGLEY

Education

1949 Columbia University
B.A. Mathematics
1951 Columbia University
M.A. Mathematics

Professional Experience

August 1972 - present	<u>RIVERSIDE RESEARCH INSTITUTE</u> New York City Member of the Research Staff
August 1967 - August 1972 (6/65 - 9/66 part-time)	<u>MOBIL OIL CORPORATION</u> New York City Associate Engineer and Consultant in Mathematics
September 1966 - August 1967	<u>NATIONAL SCIENCE FOUNDATION</u> Fellowship in Advanced Mathematics
September 1952 - August 1967	<u>NEW YORK UNIVERSITY</u> New York City Assistant Professor of Mathematics
February 1949 - September 1952	<u>COLUMBIA UNIVERSITY</u> New York City Lecturer in Mathematics

Honorary Societies

Phi Beta Kappa

Philip Bruce Landon

EDUCATION

1967 University of Utah, B.S.
1969 Rutgers University
M.S. Psychology
1972 Rutgers University
Ph.D. Psychology

ACADEMIC AND PROFESSIONAL EXPERIENCE

1972 - present RIVERSIDE RESEARCH INSTITUTE
New York City
Member of the Research Staff

1969 - 1972 BELL TELEPHONE LABORATORIES
Systems Analyst

1969 - 1972 UNIVERSITY COLLEGE, RUTGERS -
THE STATE UNIVERSITY
Co-adjutant Instructor

1969 - 1970 RUTGERS - THE STATE UNIVERSITY
N.I.M.H. Predoctoral Fellow

1968 - 1969 RUTGERS - THE STATE UNIVERSITY
Teaching Asst. for University
College Psychology Dept.

1968 RUTGERS - THE STATE UNIVERSITY
Research Assistant

1967 CITY OF NEW BRUNSWICK, NEW JERSEY
Research Assistant, (Urban Renewal
Project)

1967 UNIVERSITY OF UTAH
N.S.F. Undergraduate Research
Fellow

1967 PEACE CORPS, IRAN TRAINING PROJECT
Research Assistant, Peace Corps

Philip Bruce Landon

ACADEMIC AND PROFESSIONAL EXPERIENCE (continued)

1967 CLEARFIELD JOB CORPS INSTITUTE
Clearfield, Utah
Research Assistant in measurement
of human relations skills

1967 UNIVERSITY OF UTAH
Research Assistant for Esso Creativity
in Engineering Project

1966 UNIVERSITY OF UTAH
Research Assistant

PROFESSIONAL MEMBERSHIPS

American Psychological Association

PUBLICATIONS

Complex cognitive performance and sensory deprivation:
Completing the U-curve. Perceptual and Motor Skills,
in press. (with P. Suedfeld)

An experimental attack on smoking. (Attitude manipulation
in restricted environments, III.) International
Journal of the Addictions, in press. (with P. Suedfeld,
R. Pargament, and Y.M. Epstein)

The role of experimenter and subject expectations in sensory
deprivation. Representative Research in Social
Psychology, 1971, 2 21-27. (with P. Suedfeld,
Y.M. Epstein and R. Pargament)

The effects of set on mere exposure. Journal of Personality
and Social Psychology, 1971, 17 121-123. (with
P. Suedfeld, Y.M. Epstein and P. Buchanan)

Motivational arousal and task complexity: support for a
model of cognitive changes in sensory deprivation.
Journal of Experimental Psychology, 1970 83 329-330.
(with P. Suedfeld)

Information and meaningfulness needs in sensory deprivation.
Psychonomic Science, 1969, 5 (4) 248. (with P. Suedfeld)

Lucille M. McCulley

EDUCATION

1950 Duchesne College
A.B. English & French
1951 Faculté de Lettres
(Rennes, France)
Certificate for License
in Modern History
1952 Institut d'Etudes Poli-
tiques, Univ. of Paris
1953 Columbia University
M.A. Public Law and
Government
1956 New York Institute of
Finance

AREAS OF EXPERIENCE

1972 - Present

RIVERSIDE RESEARCH INSTITUTE
New York City
Member of the Research Staff

1958 - 1972

OPERATIONS MANAGER-ELECTRONICS
New York City
Executive Vice President

1954 - 1958

WHITE, WELD & CO.
New York City
Administrative Assistant
and Registered Representative

1952 - 1954

COLUMBIA UNIVERSITY
New York City
Research Assistant in
Development Office

HONORS

Fulbright Scholarship, France (1950-52)